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Exceptional Conveyor Equipment

Buick Foundry Employs Unusual Methods in Reducing Labor Costs—Continuous Core Baking Is One Feature

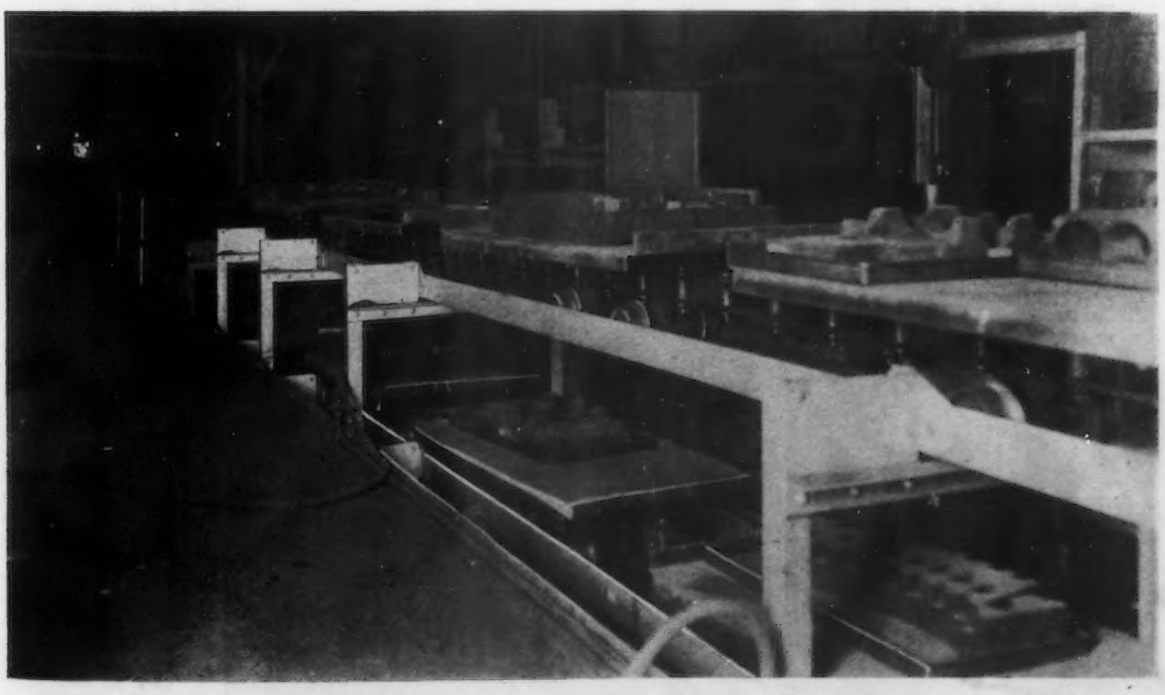
BY FRED L. PRENTISS*

ARRANGED for efficiency in operation, large production and the elimination as much as possible of hard manual labor, and with a more extensive use of conveying equipment than heretofore in a foundry, the new continuous gray iron foundry of the Buick Motor Co., Flint, Mich., is a notable addition to the list of large foundries making automobile castings. A predominating idea in laying out the plant and equipment was to improve the working conditions of the men and to make inherently hard foundry work easier. The drudgery of heavy handling and other extremely arduous work has been eliminated as far as possible by the use of labor-saving handling equipment. At the same time, attention has been given to the working conditions, by providing good ventilation secured by mechanical means, which carries away the smoke and gases from the foundry floors and makes the plant a comfortable one in which to work. The molding bays are of good height and all parts of the plant are well lighted.

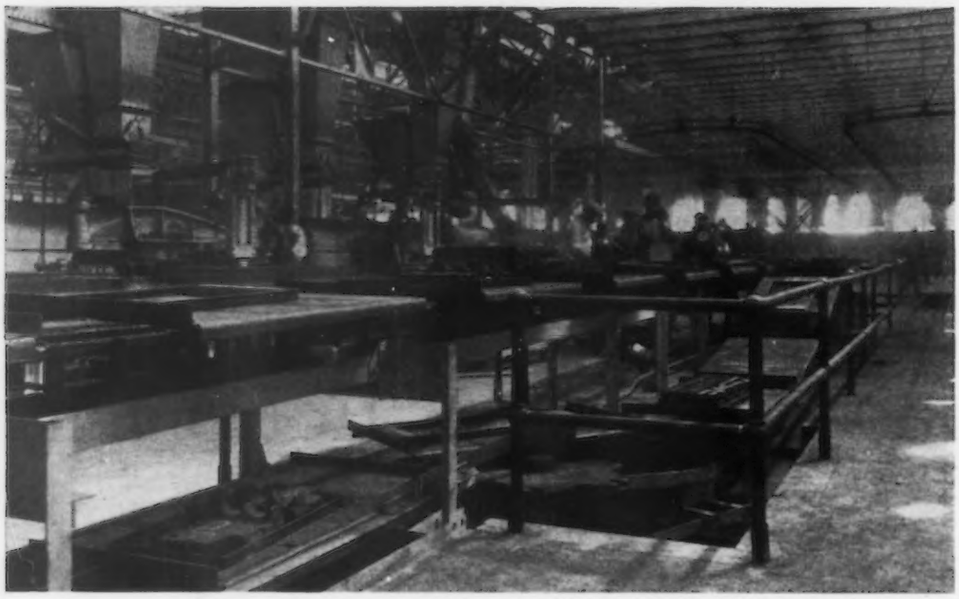
The foundry has a number of new and outstanding features in its handling and conveying equipment. Starting with the raw material, the cupola charges are made up and handled mechanically. In addition to charging scrap and pig iron into the cupolas mechanically, there is also mechanical equipment for charging the coke and limestone. A new type of automatic labor-saving equipment is provided for delivering coke and limestone to the charging floor. Another new application of the conveyor equipment is the use of power conveyors for delivering cores to the molding floors, one of these conveyors being located directly between two mold conveyor lines. Another interesting feature of the core making department is the use of continuous ovens for baking cores.

Cooling conveyors for handling castings after leav-

*Resident editor of THE IRON AGE at Cleveland.



ONE of the Conveyors for Finished Cores, Looking Toward the Core Room. This conveyor extends from the core finishing department down between the lines of mold conveyors nearly as far as the pouring zone, and loops back directly beneath itself. The conveyor tops remain right side up and cores not removed make another circuit of the conveyor



ANOTHER View of the Core Conveyor. This shows how it doubles back under itself near the pouring zone. This picture also shows the facing sand hoppers located at the left of the molding sand hoppers

ing the molds are used on a much larger scale than heretofore. These conveyors take the castings from the shake-out grate to the knock-out building and then on to the cleaning department. A new development is applied in the sand preparation and handling equipment. This is a continuous system for the preparation of facing sand and its delivery by an overhead monorail to hoppers above the molding machines.

Careful attention was given, in laying out the plant, to permit steady flow of material and work in process. Conveying equipment is generally arranged in circuits without overlapping, so that one circuit does not interfere with another and the backing up of material is avoided. The core finishing and casting cleaning departments are arranged for progressive operation and in these work is routed, where possible, on roller gravity conveyors.

When the Buick engineering department designed the foundry, it was for a fixed production of all the gray iron castings required for a daily output of 1500 Buick cars in a 9-hr. day. But capacity was furnished sufficient to permit speeding up of production 20 per cent, or to castings for 1800 cars. The engineers had the advantage of being able to lay out an entirely new plant, instead of adding to the old foundry. The main foundry building, which contains the cupolas, core room and pouring room, is 123 ft. x 657 ft. There are six 96-in. cupolas, with a capacity to pour 750 tons of iron in an 8-hr. day, making it one of the largest foundries in the country. It will make cylinder blocks and heads, crank cases, transmission cases and pistons, having complete separate molding units for each type of casting.

The record production attained on two molding lines, at the time this article was written, is 2007 cylinder blocks and 2266 heads in 11-hr. operation.

Continuous Molding Floors

There are six main molding conveyor lines arranged two in a bay. One line is for cylinder heads and the one opposite is for cylinder blocks. There are two conveyor lines for crank cases, one for transmission cases and the sixth is a spare. Two other conveyor lines, which are used for making pistons, are located in another part of the plant.

The conveyor lines are laid out for six drag and six cope machines. Steel racks are located at intervals between the cylinder head and cylinder block conveyor lines, on which cores are stocked when removed from the core conveyor. However, the cylinder head cores, which are completely assembled before being put on the core conveyor, usually go direct from the conveyor to the flask, first being set on a bench for a moment for the dust to be blown off.

No copes are used on the cylinder head molds. The core is placed on the flask, clamped down and wedged under a frame. The cylinder block cope is taken off at a point on the conveyor line about half way between

LOOKING Down the Molding Lines Toward the Pouring Floor. Cylinder block molds are handled on the line at the left, the picture showing the cope being lowered over the drag, and cylinder head molds are made on the line at the right. No copes are used in the latter, the core being clamped to the flask. The end of the core conveyor is shown in the center

the pouring zone and shake-out. A mechanical shake-out will be installed at that point. At the pouring zone is a short conveyor near the floor, moving at the same speed as the mold conveyor; the men stand on this when pouring the molds.

Metal is delivered from the cupolas to the pouring floor in 2000-lb. ladles carried by electric hoists operating on monorails, being raised electrically and poured by a hand wheel. From the large ladles it is poured into ladles of 1000 to 1300-lb. capacity carried on a tramrail system. These have electrically operated hoists with push-button control.

The mold conveyor is covered with a ventilating hood from the pouring zone to the shake-out, to prevent the heat and gases from the molds from passing into the foundry.

Thirty-eight men are used in the cylinder block unit and 30 for the head. In making the blocks there are 24 molders for six machines, nine core setters, four in the pouring gang and one does the clamping. Two others make and remove the runner heads. Three men are required for shaking out the cope, six for the drag.

No trucks are used on the foundry floor. Runner heads and other scrap which accumulates along the pouring line are dumped through openings in the floor. They pass through chutes into buckets placed at the side of the basement aisles. A lift platform truck dumps these buckets into a pit at the side of the foundry adjoining the storage yard, and the storage yard crane takes the scrap from the pit.

New Type of Shake-Out

Equipment of a new design, with automatic air operating mechanism, is provided for handling molds from the end of the conveyor line to the shake-out. The flasks are discharged from the mold conveyor on to a dead plate, where ribs on a bottom board come in contact with rollers on the plate, causing the rollers to depress and operate valves of two air cylinders.

When the bottom board depresses the roller controlling the first air valve control mechanism, the top air cylinder functions and pushes the bottom board and flask on to a set of gravity rollers. The next incoming bottom board depresses another roller, which causes the second air cylinder to function and operate a second carriage, which pushes the flask off the bottom board on to the shake-out grate. The flask is knocked off and one man places it back on the bottom board. Another man shoves the flask, with the bottom board, off the gravity conveyor on to a power conveyor which carries the flasks back to the molding machines. The shake-out grate is of the walking type, being approximately 6 ft. x 10 ft. in dimensions.

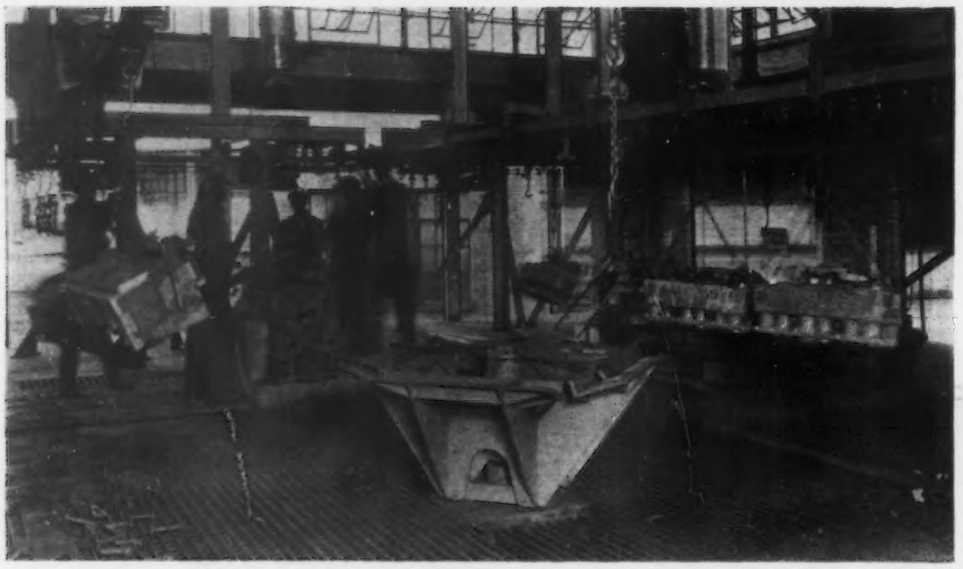
FLASKS Pass From the Mold Conveyor at the Right on to a Stationary Plate; Then Air-Operating Mechanism, Automatically Controlled, Pushes Them on to the Shake-out Grate at the Left. After shaking out, the castings are hung on the castings conveyor crossing the upper left corner of the picture. Empty flasks return to the molding floors on the conveyor at the left side of the castings conveyor. The row of hoppers in background, above the foundry floor, are for facing sand, which is delivered to the hoppers by a monorail track above. The ventilated hood appearing above the mold conveyor is for carrying away the gases and fumes

After shaking out, the castings are suspended on hooks on the cooling conveyor, which loops down close to the shake-out. Leaving the foundry, this conveyor is housed under a skeleton structure open on all sides. There is a cooling conveyor for each main molding unit, the total length of these conveyors being 4½ miles. It takes the castings 1½ hr. to pass the length of this conveyor.

The cooling conveyor carries the castings from the shake-out to the knock-out building, where each cooling conveyor line is served with its own knock-out equipment. After knocking out, the casting is hung back on the conveyor and goes to the proper tumbling mill line in the cleaning room. Cylinder heads go directly on the cooling conveyor to the cleaning room, but it is planned to send these also through the knock-out room.

The knock-out room occupies a detached building, 60 x 100 ft., which has steel roller doors on two sides, so that the lower part of the building can be kept open. It is equipped with four knock-out machines of the Stoney type. The sand passes from the machines to conveyors under the floor. After knocking out, gates and risers are removed.

As the progressive method of production is followed in the cleaning department, roller conveyors are used



THE Cooling Conveyor Carries the Castings to a Knock-out Building, Where Knock-out Machines Remove the Cores, and the Gates and Risers are Knocked Off. After the cores are knocked out, the castings are hung back on the same conveyor, which takes them to the cleaning department. Sand falls through the grating to a conveyor below

where they can be a help in handling the work. There are ninety-two 36-in. x 72-in. tumbling mills arranged in eight lines, belt driven from overhead motors, in batteries of four. The mills are reversible, operating alternately 2 hr. each way, so that the stars will be thrown against both sides of the casting. Castings are dumped directly into the mills from the conveyors which bring them from the knock-out room.

Leaving the mills, gravity roller conveyors take them to the grinding machines. Cylinder grinding is done on swinging grinders, chipping being avoided except a small amount at one end, which cannot be reached with a grinding wheel. Some hand grinding is done on roller conveyors. Sand blasting is done under 80-lb. air pressure. Defective castings are preheated to a cherry red in a pusher type heating furnace and then welded with an oxy-acetylene torch.

The last link in the elaborate transportation system in this foundry is a conveyor to deliver the finished castings to the motor building. After the cylinder blocks are given their finishing touches in the cleaning department, and are subjected to water pressure tests, they are placed on a high-speed conveyor 2360 ft. long which carries them through an overhead covered bridge to the receiving dock of the motor building. The conveyor chain is carried on 572 trolleys on 49½-in. centers, and the castings are carried on hooks suspended from the trolleys. The conveyor has a speed of 6 ft. 2 in. a minute.

Dust arresters for the sand blast equipment are located in the basement, where the air is cleaned and returned to the room at the same temperature at which it was removed. Dust from the tumbling mills is drawn to arresters outside the building.

Good ventilation is secured in the foundry and core room by forced draft. Eight fans located in the roof trusses deliver 200,000 cu. ft. a minute of fresh air to near the floor level. This air replaces that drawn out by a suction system through the hoods over the mold conveyors and through the shake-out grates.

Rapid production of pistons is accomplished in two piston units. On each piston mold conveyor line 3350 pistons have been made in 10 hr. At the end of the mold conveyor on which the pouring is done, the flasks are turned upside down over a hopper through which the castings and sand drop to a conveyor, and are carried to a large tumbling mill in the basement. The empty flasks are placed back on the conveyor.

The castings are tumbled until the rough sand is shaken off. This is discharged from one end of the mill and delivered by a belt to an elevator which carries it up to a conditioner. One sand handling unit serves both conveyors. The castings are discharged from the tumbling mill on to a conveyor which runs up an incline

CORES Are Baked in Continuous Ovens 145 Ft. Long. The conveyor line passes between the rows of core makers' benches, where the racks are loaded. Above is shown the entrance to the core baking oven. The conveyor passes up an incline to the heating zone level

to the outside of the foundry. From this they are discharged into large tote boxes in which they are trucked to the cleaning room. As the castings drop into this a man breaks off the gates and risers.

Finished Core Conveyor

Delivering the finished cores between the lines of mold conveyors, a core conveyor, on leaving the core assembly department, dips under an aisle and up to the molding floor. It extends down to near the pouring zone and loops back directly under the delivery section, at near the floor level. The conveyor has flat metal table tops 54 in. long and 34 in. wide. The cores are placed on these tables in pans of three standard sizes, the dimensions of the pans being such that they will completely fill the table. The conveyor tops remain in the same horizontal plane, or right side up, in making the loop at the end and returning to the core assembly department. Such cores as are not removed, as they are carried along on the conveyor, make another circuit.

Nine continuous core ovens, 145 ft. long, are located above the core room. The oven contains two conveyor loops, each oven handling system being made up of three parallel sections joined by a loop at each end. Suspended from the conveyor chain, which makes a circuit through the oven, are 38-in. x 54-in. racks, 54 in. high. These have adjustable shelves so that they will fit cores of various sizes. The conveyor passes between two lines of core benches, being directly back of the core makers, who place their completed cores on the racks as the conveyor moves along.

Where the conveyor starts between the benches, the lower shelves are near the floor. The first core makers load the top shelves and as the conveyor moves down the line it rises one foot, making it more convenient for the later core makers to place their cores on the bottom shelves. Reaching the end of the core benches, the conveyor makes a 180-deg. turn and enters the oven at an incline which carries it up to the oven level, where the heating zone starts. The oven again comes down to the floor level at the discharge end, and dryers when used are placed back on the racks, to be returned to the core room.

Each oven was designed for baking one core or combination of cores within a specified time. The speed of passage through the ovens is regulated by a variable-speed pulley to meet the requirements of the cores being baked. The usual baking time is about 4½ hr.

The core room was laid out with a view of having as many benches for each unit as are required to supply sufficient cores to operate the foundry at its scheduled maximum capacity. There are eight double core benches on each side of the conveyor, and from six to sixteen core makers work on each side.

Special Machines Cut Core Costs

Various special machines are provided in the core making department for increasing the output and reducing costs. All cores which are made to close limits, and require a straight, accurate joint, are ground on a revolving table above which is located a 16-in. grinding wheel. The core is mounted on a fixture on the table, there being a special fixture for each type of core. Machines with tables of various diameters are used. The operation of the machine requires two men and results in a large saving in labor as compared with rubbing the cores by hand.

Another special grinder is used for grinding a relief on a cylinder jacket core, which ordinarily is made by the use of a dryer. The core is held in place by an air clamp and the operator pushes the grinding wheel, mounted on a movable carriage, across the face of the core until the necessary amount of sand has been removed. One operator grinds 1200 pieces in a day. Exceedingly rapid production of cylinder barrel cores is being accomplished on a sausage type core machine, with which three men are making 3600 cores in 9 hr.

A simple device is used for putting paste on cylinder head water-jacket cores. The core is set in a fixture above a receptacle holding the paste. Then a printing frame is raised by a foot treadle from the container and brought against the flat ground surface of the core, in this way applying a coat of paste to the bottom

IN the Tumbling Mill Section of the Cleaning Department are 92 Tumbling Mills, Belt Driven in Batteries of Four. Here are shown some of the lines of castings conveyors, which start at the shake-out grates, act as cooling conveyors out in the open, and finally carry the castings to the knock-out room and on to the tumbling mills. Overhead hoists handle the covers of the tumbling mills. The castings pass progressively down from the tumbling mills to grinding and other finishing equipment in the portion of the building in the background. From there a high-speed conveyor carries them to the motor department

ONE of the Special Machines in the Core Making Department. The drag and cope are made at one time. The two halves of the core are seen in their molds, with wires inserted to bind them together. The two halves are later joined to form one core

of the core. This device does a good pasting job, there is no paste left on the sides of the core to be wiped off, as is necessary when the paste is applied with a brush, and altogether there is a marked saving in labor.

All cores which are dipped, pasted or blackened are dried in continuous vertical core ovens 35 ft. in height. There are eight of these ovens, in which the cores are kept about 2 hr. to make sure that they are perfectly dried.

The core making department is arranged for progressive finishing and assembling. The movement of the cores from the baking ovens to various points of operations and on to the assembly line is largely on gravity conveyors. After final inspection, they are transferred to another gravity conveyor, on which they move to a point adjacent to the power conveyor, on which they are transferred, which carries them to the molding floor.

Girls are employed in the core department in making, cleaning and assembling light cores. Under the plan followed, which is proving satisfactory, the girls do not become direct competitors with the men on similar work and piece rates. Also, while not wholly segregated, the girls do not work side by side with the men.

Molding Sand Conditioning System

Each of the six molding units has an independent continuous sand handling and preparation system with a capacity of 75 tons an hour. Sand from the molds passes through the shake-out grates into a reclaiming system, consisting of a series of conveyors and screening and elevating equipment operated as a continuous or closed system. Provision is made for the introduction of green sand and bonding material at the proper points. Cores are separated by a screen and the metal is taken from the bulk sand by a magnetic separator underneath the screen hopper. The reclaimed sand is elevated to a double paddle pug mill, where the sand is thoroughly mixed and water is added for tempering.

Leaving the pug mill the sand is aerated and fluffed in a conditioner. From this unit it is discharged directly into a finished sand storage bin, underneath which is a cutting-type bar feeder which feeds it on to a belt conveyor. The latter delivers the tempered sand to a bucket elevator which raises it to a flight conveyor that distributes the sand to hoppers above the molding machines.

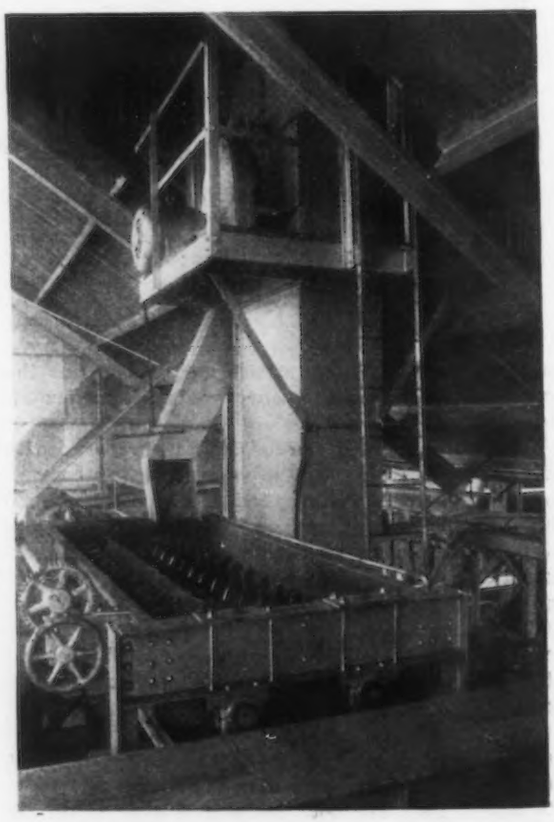
Surplus sand from the flight conveyor is discharged at the end of the conveyor through a chute to a reciprocating flight conveyor, located in a trough underneath the molding floor. Strike-off sand from the molding machines and cope shake-out sand are discharged also on to this conveyor, which carries the sand back into the sand preparation circuit.

Molding sand is well conditioned by its movement through the conveying, elevating and screening equipment before it is finally treated in the pug mill and conditioner. Forced air drawn through the shake-out grate adds materially in cooling the sand. It is further cooled in passing over the conveying and conditioning equipment before reaching the storage bin, which has a capacity of 150 tons, or a 2-hr. supply.

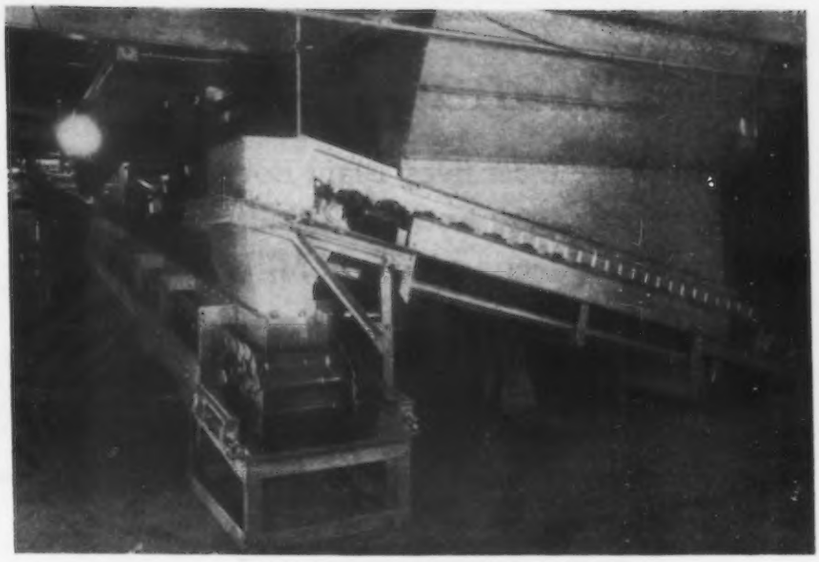
Core sand tailings from the screen and the metal reclaimed by the magnetic separator are discharged from each unit on to one collecting conveyor 350 ft. long, serving the six units. On the drive end of this conveyor is a magnetic separator which separates the sand from the tailings. The discharge end of the conveyor is at one side of the raw material storage yard.

The equipment for conveying and preparing sand for the six main molding units, up to the point at which it is elevated above the foundry floor, is located in a pit beneath the foundry, 67 ft. wide, 240 ft. long and 12 ft. high.

Of particular interest is the facing sand preparation and handling plant, because it is the first of this type for continuous mixing and conditioning of facing sand. A fine mixture and proper blending of the sand is secured, and the sand delivery system provided is regarded as far more efficient than the common practice of using trucks or wheelbarrows to take facing sand to the molding floors. The sand, after being prepared, is delivered through a sand handling system



MOLDING Sand, Reclaimed in a Pit Beneath the Foundry, Is Carried up Above the Foundry Floor in the Elevator and Discharged into the Pug Mill Shown. This delivers it to a conditioner beneath, the latter being directly over the finished sand storage bin, from which it is finally delivered to the molding floors for use



PIT Under the Foundry. Sand drops from the shake-out grate into the hopper (right), from which an apron conveyor delivers it to a second conveyor which carries it to a screen

to hoppers above the foundry floor, located at the side of the molding machine hoppers. From here it is discharged by air-operated feeders with push-button control.

Grab buckets deliver the sand from the sand storage building to overhead storage hoppers. Underneath these hoppers are proportioning feeders which deliver the sand, seacoal and bonding material to a pug mill. From this it goes to a blender. After blending it is elevated to a conditioner for aerating and fluffing, before it is put into a storage hopper. From this hopper it is delivered to the facing sand hoppers above the molding floor, in buckets of 18 cu. ft. capacity handled by a monorail crane which runs alongside the molding sand distributing belt. There are two units for the preparation of facing sand, each having a capacity of 20 tons an hour.

Most of the new sand added to the molding sand comes through the facing sand, which appears to be used in more liberal quantities than when handled in the usual way. It is stated that with this practice the amount of new molding sand required has been reduced 50 per cent, as compared with that used in the old foundry.

Core Sand Handled by Cranes

Monorail cranes are used, also, for delivering sand to the core room. Bank and sharp sand used for core sand are delivered into hoppers through measuring baffles. The sand passes through a screen and to a mixer beneath, and core oil and water are added. From the mixer a belt elevates it to a hopper from which the monorail hoist carries it to hoppers above the core makers' benches. Each pair of benches has chutes connected to the hopper above. The monorail tracks to the core benches are located between the core ovens.

Six men handle and prepare 600 tons of facing sand a day. The same number of men handle 300 tons of core sand a day. Sand is stored in concrete bins in a steam-heated storage building having a capacity of 1000 carloads. This is served by overhead traveling cranes.

Close watch of the sand is kept in the foundry laboratory, which is well equipped with devices for testing the physical and chemical properties. Much of the testing equipment was developed by the Buick company. Samples are taken at 30-min. intervals throughout the day and labeled, providing a continuous test, so that immediate changes can be made in the mixture if desired. Sand is tested for its strength, bond and permeability. Transverse tests are made of core sand. Included in the sand testing equipment are machines for making tensile, moisture and grain fineness tests, and a small Simpson sand mixing machine.

Operation of the foundry is on a piece-work basis, 98 per cent of the employees, or nearly all except the office help, being paid piece rates. The core makers are on an individual piece-rate scale. The remainder of the piece-rate employees are paid under a group piece-rate scale.

The foundry was designed by the engineering department of the Buick company and a satisfactory record was made in constructing the buildings and installing the equipment. The appropriation for this plant was made Oct. 5, 1926, and the first iron was poured Aug. 3, 1927.

The six molding units, including the sand preparation and conveying equipment and mold conveyors, were supplied by the C. O. Bartlett & Snow Co.; the facing and core sand mixing and conveying equipment and conveyors for taking core sand from the knock-out, by the Chain Belt Co.; the finished core conveyor, the cooling conveyors and finished casting conveyor, by the Palmer-Bee Co.; the charge make-up, cupola charging equipment and the monorail cranes for handling facing and core sand, by the Chisholm & Moore Mfg. Co.; the tramrail system in the pouring zone, by the Cleveland Crane & Engineering Co.; the continuous horizontal core ovens, by the Young Brothers Co.; the vertical core ovens, by the Detroit Sheet Metal Works; the cupolas and tumbling barrels, by the Whiting Corporation; the sand blast equipment, by the W. W. Sly Mfg. Co.; the dust arrester equipment, by the Pangborn Corporation; and the core sand screens and mixers, by the Standard Sand & Machine Co.

Methods of handling raw material, the mechanical equipment for making up the charges and the method of charging the cupolas in the Buick foundry will be described in a later article.

Oakite Products, Inc., completes its nineteenth year of industrial cleaning service when the field service men, technical staff and executives, comprising the organization, meet in the general offices in New York, Nov. 7 to 10 inclusive. Sixteen technical papers will be presented covering such subjects as "Developments in Cleaning Operations for the Oil Industry," "Handling Metal Cleaning and Rust Prevention Problems," and "Electroplating and Cleaning Methods."

The General Electric Co., Schenectady, N. Y., has issued a booklet to its stockholders which contains photographs and brief descriptions of the company's different factories. Photographs and short sketches of some of the men prominent in the founding of the various branches and plants are also included.

How Management Aids Prosperity

Wage Incentives, Plant Location, Determining Economic Purchase Lots and Quality Production Are Topics at Meeting of A. S. M. E. Management Division

OBSERVANCE of National Management Week reached its culmination at a meeting of the Management Division of the American Society of Mechanical Engineers, held Oct. 26 and 27, at the Sagamore Hotel, Rochester, N. Y. Coordinating wage incentives and production control, plant location, determining economic purchase lots and coordinating quality control and production control were the principal topics considered, and the sessions were marked by a keen interest in the application of scientific management theories to manufacturing problems which have hitherto been solved by the trial and error method. Visits to Rochester's varied industrial plants provided many fine examples of successful scientific management in its broadest phases, and continued emphasis was placed on the part this comparatively new development will play in America's present and future industrial prosperity.

Coordinating Capital and Labor

HOW management has become a third party tending to remove the distinctions between capital and labor and thus build up a more consistent industrial prosperity than the country has ever known before, was the message of Gano Dunn, president J. G. White Engineering Corporation, New York, and chairman of the National Research Council, who spoke at the dinner meeting on Wednesday evening.

"The very title of my subject," said Mr. Dunn, "'Management's Contribution to Industrial Prosperity,' starts with a challenge. Less than a generation ago the factors in industry were capital and labor and there was a sharp distinction between them. The advent of the third party, 'management,' has been for the good of both the others. The distinctions have been removed, so that to a considerable extent we are all capitalists, and we shall egregiously fail if we do not make it equally true that we are all laborers. Management, as we know it, has the sympathy of labor and the confidence of capital; in a way it is half laborer and half capitalist."

Looking toward the future, Mr. Dunn continued: "Management may make contributions to two kinds of prosperity—immediate prosperity, the prosperity of today, or next month, or of the next two or three years; and ultimate prosperity, the prosperity of the next decade and beyond." It was this latter type of prosperity which the speaker emphasized as the great hope of management, and his plea was continued at the other sessions of the meeting where stress was laid upon intelligent building of future business success.

Wage Incentives and Production Control

THE subject of coordinating wage incentives and production control was dealt with concretely in three papers, each one of which described the system in use at the particular plant represented by the author. This treatment emphasized variation of approach with ultimate achievement of a common goal; that is, the fullest utilization of expended energy both human and mechanical.

The Charles E. Bedaux plan of production control, as used in the plants of the White Sewing Machine Corporation, Cleveland, was described by Oscar Grothe, vice-president of that company. Under this plan a measuring unit called the "B" is created which corresponds to the energy developed by a man working under normal conditions at a normal rate of effort for one minute of time. "The average number of 'B' units developed or produced per hour," said Mr. Grothe, "is the measure of the labor rate of accomplishment, whether it considers the individual, the department or the plant as a whole."

"Generally speaking," the author continued, "through the use of the 'B' unit, control is established to give actual performance against standard expectations and to analyze the difference, thus enabling those responsible to eliminate those differences which represent labor waste on such items as operators below standard, excess set-up, lost time, reoperations and repairs or excess indirect labor. The control of production is attained through the application of standards, expressed in 'B's,' to all forms of labor, as well as to space requirements or capacity, cost records and the other factors in production control."

Referring to production control in general, Mr. Grothe said: "Give to industry the use of a common term, a constant unit of measure that places a true value on all work done, on all men employed whether at labor or supervision, that gives the exact extent of all gains, losses and errors and controls all changes in schedules and processes, all expressed in a manner easily understood and permitting through its simplicity a continuous grasp of the entire picture, and you will automatically transform useless efforts into useful ones."

Standard-Time System of Wage Payments

Application of the standard-time system of wage payment and the group system of labor was explained by D. B. Charters, chairman occupation and rate committee, Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa. Under this plan a standard time allowance is established on each operation in the plant. When the time taken to perform the work is equal to or less than the time allowed, the operator is paid for the time allowed at his standard-time rate, which is a certain percentage higher than his hourly rate. When the time taken is greater than the time allowed the worker is paid for the time taken at his day rate. Thus the employee is guaranteed a certain minimum rate. But this system, according to Mr. Charters, stimulated individual performance at the expense of cooperation. This led to the introduction of the group system of labor. "A group," the author stated, "is a number of workers working on the same class of product who pool the product of their labor, and whereby each man shares in the earnings of the group in proportion to the amount of time he works in the group and in proportion to his ability."

Mr. Charters maintained that better cooperation, reduction of supervision, reduction of non-productive labor and simplification of costing and time keeping are possible under this system. He concluded the paper with an explanation of some of the bonus and wage incentive plans in use at the Westinghouse plant.

Thinking in Production Cycles

The importance of training and developing the personnel working on basic schedules to think in terms of production cycles was brought out in a paper by F. B. Calhoun, manager production control division, Goodyear Tire & Rubber Co., Akron, Ohio. "In order to synchronize correctly the flow of material through the plant," he said, "it is necessary for all machines to work to a time standard scientifically determined. Therefore, all work is scheduled by machine minutes. The chart used in breaking down orders into minutes is based on piece work rates."

Although stating that no definite incentive plan of

wage payment is now used at the Goodyear plant, Mr. Calhoun admitted that a well developed plan of scientific management must include one, and that such a plan is now in an experimental stage at the Goodyear plant. He further stated that the company has demonstrated beyond a doubt that production control in continuous process industries can be made a complete success with consequent stabilization of employment and increase in efficiency of labor.

Principles of a Successful Wage Plan

Adaptation of the standard-time system of wage payments, as used at the Westinghouse plant, to non-productive as well as to productive labor was illustrated in the discussion following these papers. Mr. Charters explained that each group was composed of both types of labor and that the non-productive or unskilled laborer shared in the profits of the group in an amount corresponding to his ability. He likewise stated that the untrained worker was paid in accordance to his experience, and with the assistance of the veterans of the group was soon able to better his condition.

Participation of foremen in the financial rewards of increased production was suggested by John Wakeman, North East Electric Co., Rochester, as a point of considerable disagreement in plans of production control. Various opinions as to the advisability of this were voiced, but it was generally agreed that under ordinary conditions a flat rate for foremen is generally more satisfactory.

Spirited disputes as to the relative merits of different systems of production control and wage payments arose, and Mr. Grothe seemed to express the opinion of the majority by stating that, whatever the plan adopted, it should be so completely "sold" to the management that all its phases can be defended to the last detail. If the laborer shares in this belief the plan will most certainly be successful and lead to a better understanding and morale in the company, which is the ultimate aim of scientific management.

Quality Control in Manufacture

EDUCATION of the controlling personnel and of the operating personnel in general was stressed as the important factor in the control of quality in manufacture by James H. Marks, purchasing manager Packard Motor Car Co., Detroit, in a paper presented at the session devoted to the coordination of quality control and production control. "The most important thing necessary for accomplishment of a high standard of quality," said Mr. Marks, "is the education of the entire manufacturing personnel to the standards desired, and this of all things is the hardest to do. It is easy to obtain precision machines and tools and accurate gages, but it is very difficult to develop in the minds of a group of men the same and one thought relative to a standard of workmanship.

"This essential of an educated organization is an intangible thing which makes it very difficult to obtain. It is necessary to have men of experience who are able to say, possibly without being able to explain just why, either this thing will go or that will not go if the standard of product is to be maintained. This knowledge is developed as pride of organization is developed. It is handed down from man to man, and is a sort of sense that is developed by years of contact between the master craftsman and the designer."

Discussing the connection between quality control and production control, Mr. Marks said: "There can be no relation between quality control and production control except that production control, resulting in an uninterrupted flow of materials, makes quality control easier. If an organization sets out to maintain a certain standard of quality and obtain a certain amount of production constantly at the same time, either one or the other must suffer. If a quality product is to be turned out, quality must come first and uniform rate of production must be secondary. . . . It does not necessarily follow that one cannot manufacture a quality product uniformly, because it is being done. Plans must be made, however, to make up the losses which are bound to occur when mistakes are made. It has been proved again and again that the finest quality of work can be done in quantity production because large quantities warrant large investments in machines and tools."

Inspection in Quality Control

The importance of proper inspection in the control of quality was brought out by Walter W. Graeper, Bausch & Lomb Optical Co., Rochester, in another paper at this session. Representing a large manufacturer of optical instruments and accessories, where quality and precision must come before mass production, Mr. Graeper was able to speak authoritatively upon inspection as developed to its finest points. Beginning with the careful testing of raw materials at the Bausch & Lomb plant, inspection is next carried to the tools and machines used in production and articles are given further checks and tests as they pass through the various stages of manufacturing operations. Final inspection occurs in a department which is entirely independent of the production organization and is wholly responsible for the various units as they leave the plant. In some cases a further spot check is resorted to as a final test on the 100 per cent examination carried out in the inspection department.

Complications arise, the speaker pointed out, from the two contending forces which influence the inspector. The one, demanding continued higher quality, comes from the consumer and the sales department; and the other, developing inside the factory, arises from a struggle to keep down costs. The latter influence is particularly strong when manufacturing difficulties arise, when rejections mean retarded delivery, scrapped parts and heavy losses. Continued compromise between these two forces must be resorted to by the inspection department, and frequent conferences, including representatives of the engineering, production, manufacturing and inspection departments, are held before beginning work on an article. These conferences have been found to be of value in creating a proper understanding of the problem at hand and thus prevent future difficulties.

"It is the policy of the inspection department," Mr. Graeper said, "not only to pass or reject articles which come to it, but to find, when possible, the reason for failure and the source of trouble. This policy frequently results in real saving, especially of time, for, as a rule, the inspector is in a more favorable position to detect sources of trouble in connection with performance than the individual who makes the parts or assembles the instrument."

Modern Equipment Important

The maintenance of a complete file of new machinery and equipment brought out in the manufacturer's particular field was stressed by M. R. Edwards, Bemis Brothers Bag Co., St. Louis, in a discussion of these papers. Such a file should be referred to constantly by the factory manager or person who happens to be in charge of purchasing new equipment, and Mr. Edwards pointed out that no attempt should be made to economize in equipping a plant with gages, precision tools and other machinery when quality production is desired.

Factors in Plant Location

AT the session devoted to plant location, Tyler S. Rogers, consultant, New York, emphasized the fact that choosing a plant location is a job for the engineer and not the realtor. "The problem of locating a new industrial plant," he said, "divides itself into two parts: first is the selection of a location, and second is the selection of a site. The distinction should be noted, as location connotes a much broader territory than site and might be defined as a general region or district. Site, on the other hand, should be used to refer only to a specific piece of land of limited dimensions.

"Studies to select a suitable location," Mr. Rogers continued, "should cover the following ten subjects: climate, natural resources, power sources, transportation of raw materials, distribution of finished products, labor characteristics and supply, State and local labor and tax legislation, cost of moving, type of plant and

local advantages. The relative importance of these elements varies with every problem, and the predominating element, as well as the final choice, can be determined only by studies which show the influence on profits of each of these items. It is, therefore, desirable to reduce all of these factors to a dollar basis as the first step in any careful analysis to find the best location for any given plant."

The speaker mentioned railroad siding and waterfront improvements, size and orientation of property, topography, geology, public utilities, publicity value and the ultimate cost of improvements as the outstanding factors to consider in choosing the final site for a plant after the general location has been decided upon. Following a careful analysis of these factors the engineer should place before his employers the basic data upon which his recommendations are founded and the final choice of location is greatly simplified.

Emphasizes Future Plant Growth

The importance of foreseeing as clearly as possible the future industrial growth of the geographical district in which a plant is to be located was stressed in a discussion of Mr. Rogers's paper by the late Perley F. Walker, dean of the college of engineering, University of Kansas, Lawrence. A district which is at present a large consumer, Dean Walker's paper pointed out, may not prove nearly so advantageous a location for a plant as a comparatively undeveloped locality with great potentialities for growth. Under such circumstances it is very important to locate a plant on railroads which have direct access to new territories so that business may be economically sought in other regions as the older consuming district becomes less active.

When Cities Compete for Industries

Lively interest was shown in the competition which has arisen recently between different cities in securing industries. It was pointed out that intensive campaigns by chambers of commerce and affiliated organizations often result in one city's gain and another's loss and that economic considerations are quite likely to be given little attention.

John F. Clark, Rochester Gas & Electric Corporation, Rochester, who has been active in the program for securing new industries of the Rochester Chamber of Commerce, told of investigations he has made of the plans of other cities to stimulate their industrial growth. After pointing out the danger of carrying this work to extremes, he stated that the need for aiding companies already operating plants in the city is just as important as seeking new factories.

Otherwise a rival city may be successful in securing a valuable industry from its neighbor when no urgent economic considerations call for a change. Mr. Clark emphasized the fact that a city which tries to get new industries through a sacrifice of taxes, the granting of free sites and other inducements is quite likely to get undesirable results and that a careful scientific study of the situation will surely lead to a sounder economic growth for both city and industry.

Locating a Foreign Plant

Application of the principles of plant location to the establishment of a factory in a foreign country was discussed by Edward G. Miner, vice-president of the Pfaudler Co., Rochester, which operates a plant in Germany. He stated that an important factor in the success of that company's European plant was attributable to careful consideration of the essential racial characteristics and customs of the people in the surrounding locality. "Careful economic studies were made," Mr. Miner said, "but recognition of the German 'love of the land' and a conformity to the industrial customs of the country without attempting to introduce new and foreign machinery and methods were partially responsible for the success of our establishment."

Economic Production Quantities

DETERMINATION of the economic production quantity, or that quantity which can be produced at the lowest total unit cost, was the subject of a paper by Fairfield E. Raymond, Crosby Steam Gage & Valve Co., Boston. Mr. Raymond derived a mathematical formula for determining the economic production quantity, taking into consideration not only fixed charges on each process order and investment charges on the capital involved, but also rental charges on the space occupied by the article when carried in stock and losses due to deterioration and obsolescence and to the nature of the process.

Discussion brought out the fact that the formula for determining economic production quantities may best be applied in plants where one particular type of product is produced, and the question was raised as to whether it may always be coordinated with sales demand. John C. Summers, production engineer, Baltimore, suggested that the formula would work better where complete or almost complete control over raw materials and inventories is feasible.

Determining Minimum Cost Purchase Quantities

"The ideal condition in purchasing," said Prof. R. C. Davis, General Motors Institute of Technology, Flint, Mich., "would be an assured delivery of the exact quantity of materials necessary to meet the needs of the plant, at the exact time that the old stock is exhausted, making it unnecessary to carry reserve stocks." It was the purpose of Mr. Davis's paper to show how this ideal may be approximated by means of a mathematical formula.

"In the better managed plants," he said, "accurate information regarding prices and price trends is being obtained regularly from records of previous quotations and various reporting services. . . . The quality of purchased materials is being insured through the use of properly prepared specifications in making the purchase contract and in inspecting the goods when delivered. To insure deliveries as promised, vendors' records, showing capacity and past performance of each vendor from whom the company has had occasion to buy goods, are studied before the order is placed. These and other precautions may be taken to insure that the company gets the right quality, delivery and price. However, determination of how much to buy may not receive the same careful treatment."

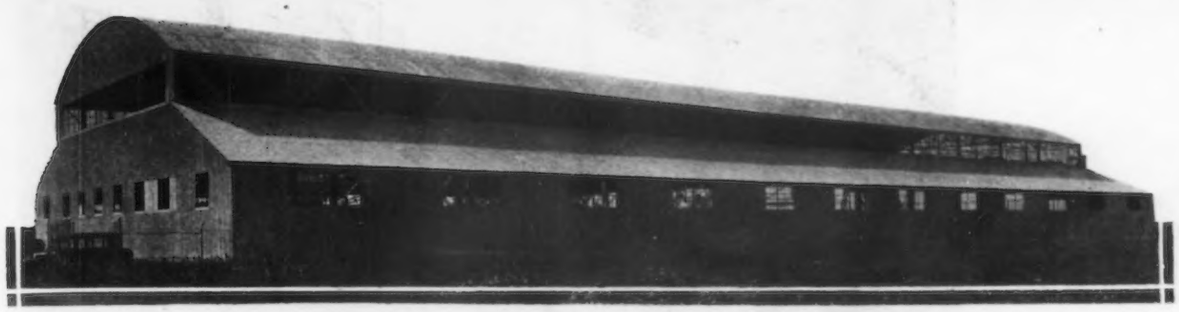
The speaker presented formulæ for determining the minimum ordering quantity, the maximum ordering quantity, storage charge, the minimum cost quantity, and finally the minimum purchase quantity. At the conclusion concrete examples were introduced to show the practical application of the formulæ.

Factors suggested in the discussion which might influence the application of Professor Davis' equations were control of labor, fluctuation of raw materials costs and control or procurement from vendors. Slight opposition to the application of science to purchasing was expressed in the discussion, as the tendency for relying entirely on the experience and judgment of particular officials in the firm has by no means disappeared from business; but there was an overwhelming opinion in favor of trying out new methods which might be an improvement over comparatively successful practices of the past.

Purchasing Material Handling Equipment

METHODS of applying materials handling formulæ adopted by the Materials Handling Division, American Society of Mechanical Engineers, were suggested in a paper by George E. Hagemann, associate editor, *Manufacturing Industries*. "Selection of new equipment," he said, "involves a checking up on the efficiency of an existing installation and an evaluation of the proposed investment in terms of its financial returns.

"Good judgment and economic analysis," he went on, "are the two measuring factors upon which the selection and utilization of material handling equipment depend directly and solely." He defined the fundamental requirements to consider when buying new equipment and in checking up on the efficiency of an existing system as correct plant layout, correct handling equipment, correct use of equipment, provision for adequate maintenance, provision for regular check-up on performance and plans for thorough restudy of methods at stated intervals.



Applies Welding in Constructing New Fabricating Shop

Layout and Equipment for Efficient Movement of Materials Also a Feature

ELECTRICALLY-WELDED structural members have been used extensively in the new fabricating shop of the Mississippi Valley Structural Steel Co., Melrose Park, Ill. The arc process was employed for such members as columns, crane girders and roof trusses, special welding equipment, designed by G. A. Caldwell, vice-president and general superintendent of the Mississippi Valley company, being used for this work. The machine is entirely automatic and simultaneously makes either one or two continuous seams, either one or two intermittent seams or one continuous and one intermittent seam.

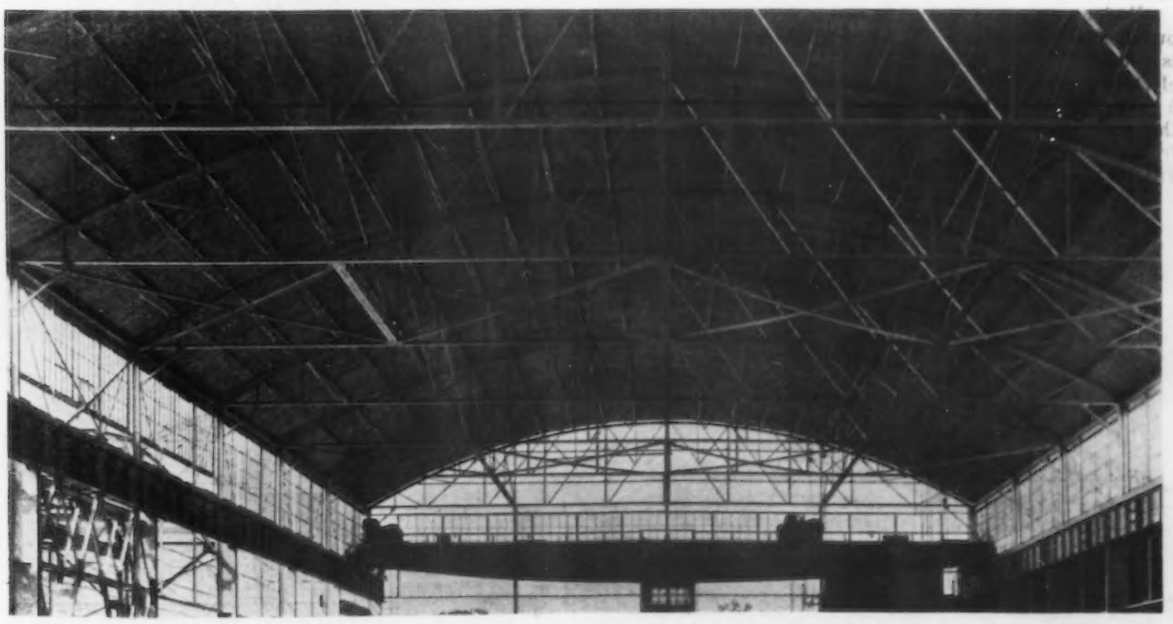
The most extensive use of arc-welding is found in the warehouse members. This building, shown in the illustration above, is 105 ft. wide by 340 ft. long, and provides a covered storage space for shapes, plates and bars. A lean-to, 25 ft. in width, is provided along the east side to serve as a cover for the ends of long shapes which may project beyond the limits of the main bay, which is served by a 15-ton electric traveling crane furnished by the Harnischfeger Corporation, Milwaukee.

Crane columns and runway girders are made of standard shapes electrically welded before erection in the field. The roof trusses were fabricated in a like manner. Bolts and rivets were used only for diagonal braces, this method being an aid in erecting the building, and for light sections such as girts and vertical members in the side framing. The sides and roof are inclosed with corrugated sheets. The size of this warehouse is such that it will not be necessary to store any rolled steel materials where they will be exposed to the weather. The north end of this building is served by two standard gage switch tracks.

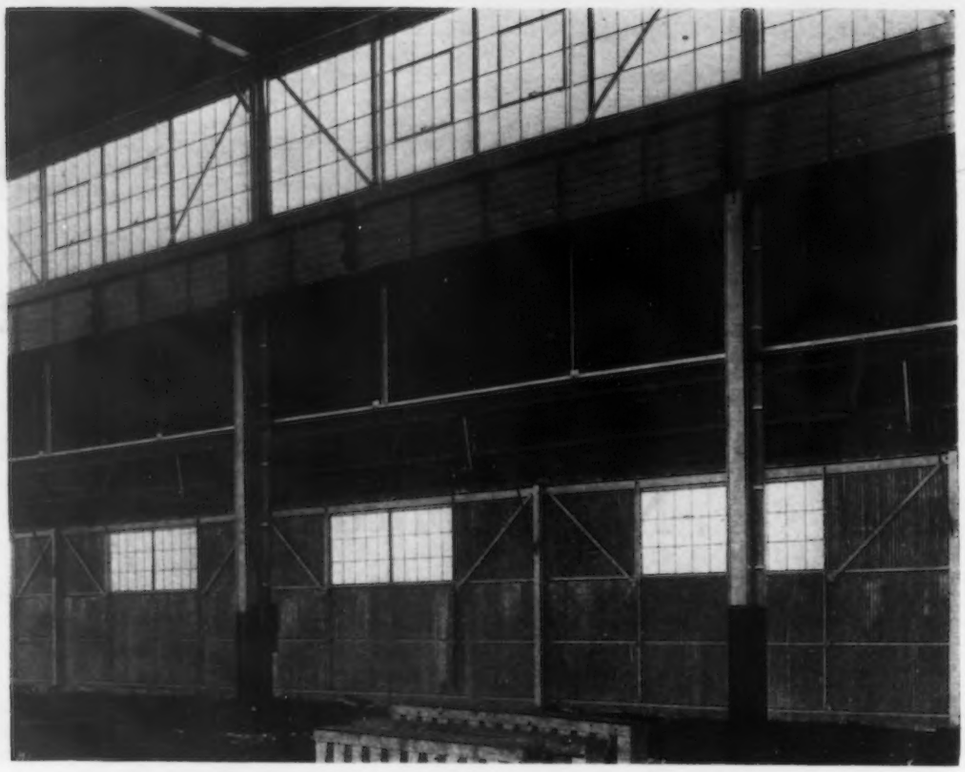
Punch and Assembly Shops Adjoin Warehouse

Extending west from the warehouse is the punch shop which is divided into three longitudinal bays, each 55 ft. wide. Material from the warehouse enters the north bay to a spacer beam punch. Floor space is also provided in this bay for a traveling riveter and rivet heaters. A beam and column bolt-up and rivet floor extends across the west end of the north and center bays. An angle shear is located at the entrance to the center bay. Machinery in the south section of the punch shop includes a plate shear, an angle punch and a spacer plate punch. A section of this floor is reserved for arc welding.

The assembly shop is a building 85 ft. wide by 135 ft. long. It projects west from the punch shop and



The Warehouse Provides Covered Storage Space for Shapes, Plates and Bars. The roof trusses, the span of which is 80 ft., were among the members which were arc welded



Built-Up Column Sections and Crane Girders, as Well as the Roof Trusses, in the Warehouse Building Were Welded by the Arc Process

it is served by a 15-ton Harnischfeger Corporation electric crane. Equipment located in this department includes an end miller and three traveling jib riveting cranes.

Cars are loaded by a 20-ton, 80-ft. span overhead crane which travels on a 200-ft. runway, which is served at one end by the warehouse switch track. The A-frames and crane girders of this structure are electrically welded throughout.

Tracks Provide Outlet from Warehouse to Loading Yard

Outstanding among the features in this shop is the method employed for the movement of materials. Ordinarily cars will be unloaded in the north end of the warehouse by the overhead crane. Three industrial tracks start near the center line between the lines of crane columns in the warehouse and pass longitudinally through the punch shop. These tracks are extended to the loading yard crane. The center track provides a direct outlet from the warehouse through the punch shop and the assembly department to the loading yard.

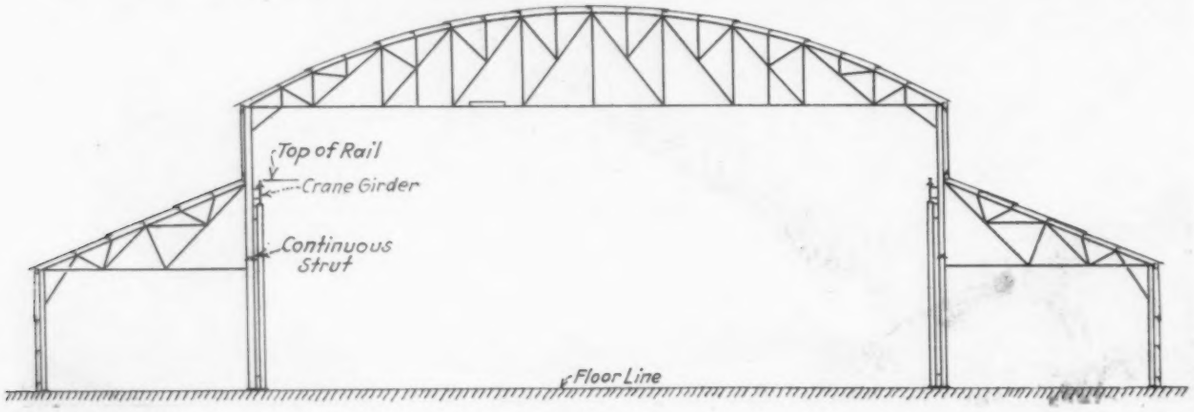
Under normal conditions longitudinal transfer in the punch shop will be on industrial cars. Cross transfer is provided for by the installation of 12 floor-operated electric cranes which range in capacity from 1 ton to 5 tons each. These cranes use the bottom chords of the roof trusses for tracks and they obtain traction from racks which are built into the bottom chords. The teeth of the racks project downward. This equipment was furnished by H. D. Conkey & Co., Mendota, Ill. Numerous air hoists and jib cranes are located at advantageous points throughout the shop.

Corrugated sheets are used to inclose the sides of the punch and assembly shops. The roofs of these departments are constructed with cement tiles which are overlaid with a composition roofing. The fact that the ends of the punch shop are inclosed by buildings that extend above the roof of that department has led to an extensive use of skylights both at the lines of columns and at the centers of truss spans.

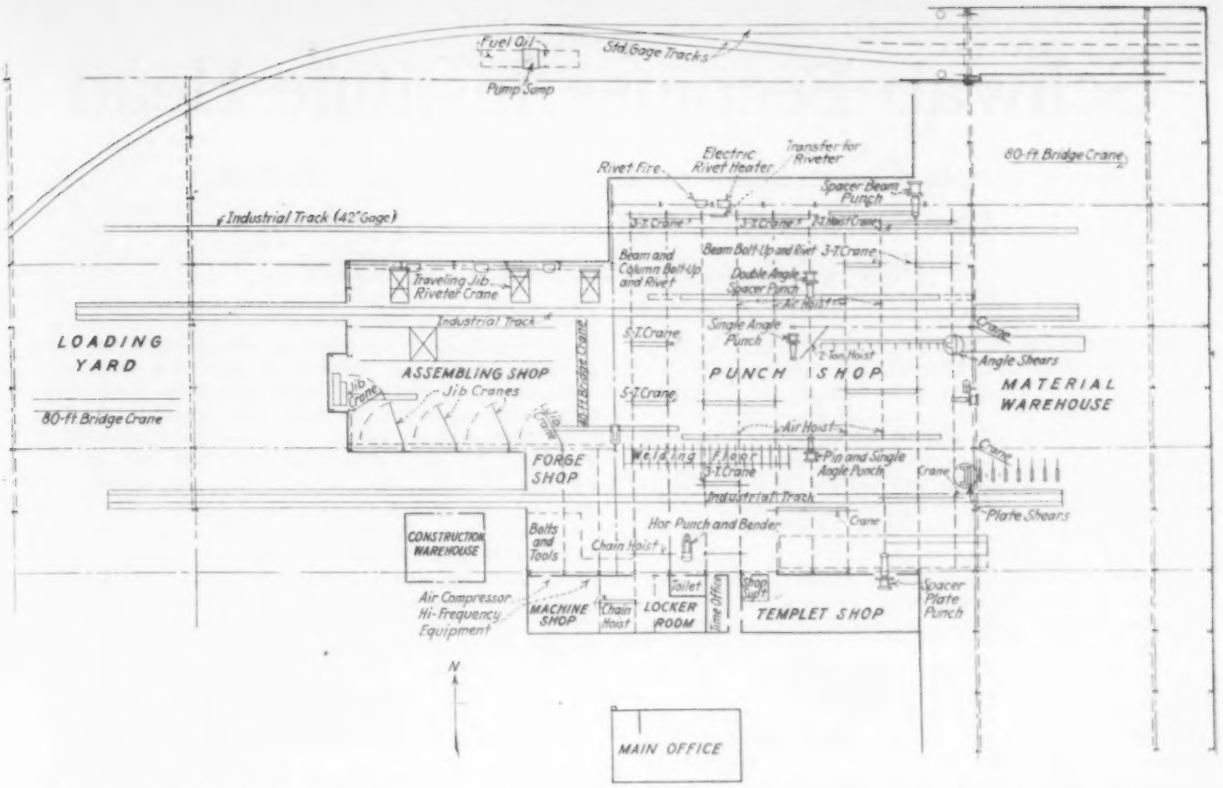
In the southwest corner of the punch shop are located a forge shop and a store-room space for tools and bolts and rivets. A steel frame structure with brick filled walls extends along the south wall of the punch shop. On the first floor are housed the machine shop, sanitary equipment, locker room, time keeper's office, the superintendent's office and the template shop. A portion of this building is two stories in height, thus providing space for a restaurant.

Provision Made for Expansion

The main office is an isolated building which is constructed of brick. It is provided with a separate heating plant. The machine and template shop building is heated by a separate oil-fired unit. The boiler was manufactured by the Leader Iron Works, Decatur, Ill. Fuel oil storage and the pump house are located near the switch track north of the main shop. No general



Cross Section Through the Warehouse Building. To facilitate erection, bolts and rivets were used on wind and sway bracing



Crane and Hoist Equipment Is Arranged to Provide Easy and Rapid Handling of Material Through All Departments

scheme has been worked out for heating the structural shop. All machines are driven by individual motors. Electric current is purchased from the Commonwealth Edison Co., Chicago, the high tension wires entering a sub-station which is located on the roof of the machine shop.

This shop stands on an 18-acre tract of ground. The arrangement of the buildings provides ample opportunity for expansion. The first undertakings along this line will be an extension of the assembly shop to the loading crane. A beam and column shop extension will go north to the switch track and west to the loading crane and a welding shop will be constructed south of the assembly shop between the machine shop and the loading crane.

R. D. Wood is general manager of the company. P. W. Armstrong is works manager of the Melrose Park shop and W. A. Stickey is superintendent.

Meeting to Discuss Special Structural Steels

Monday evening, Nov. 14, the New York chapter of the American Society for Steel Treating will hold an open meeting and round table discussion on the general subject of "Strong Steels for Modern Long-Span Bridges" in the Merchants' Association Rooms, Woolworth Building. The program follows:

"Designer's and Owner's Requirements," by Leon S. Moisseiff, consulting engineer, New York, and advisory engineer for the Port of New York Authority, under whose direction the Hudson River Bridge is being built from Fort Washington to Fort Lee.

"Manufacture of Acid Steel for Suspension Cables," by H. C. Boynton, metallurgist, John A. Roebling's Sons Co., Trenton, N. J., which has the cable contract for the Hudson River Bridge.

"Wire Drawing and Heat Treatment," by A. V. DeForest, research engineer, Page Steel & Wire Co., Bridgeport, Conn., which made the wire cables for the Philadelphia-Camden Bridge.

"Manufacture of Structural Silicon Steel," by H. T. Morris, metallurgist, Bethlehem Steel Co., Bethlehem, Pa., which made the steel in the Philadelphia-Camden Bridge.

"Nickel Steel for Long-Span Bridges," by Clement E. Chase, Modjeski & Chase, consulting engineers, Philadelphia. Mr. Chase was principal assistant engineer in charge of the construction of the Philadelphia-Camden Bridge.

"Limitations Set by the Fabricator and Erector."

Power Transmission Association to Meet in December

Program for the annual meeting of the Board of Advisory Engineers of the Power Transmission Association covers a number of papers and committee reports. The meeting is scheduled for Dec. 7 in the Hotel Commodore, New York. Among other items on the program is a discussion of a proposed handbook to be published late in 1928.

There will be considered the possibility of joint activities with the American Society of Mechanical Engineers in connection with topics under mechanical power transmission. This discussion will be led by W. Batt, president S. K. F. Industries, and Robert T. Kent, general manager Bridgeport Brass Co., who is chairman of the A. S. M. E. standing committee on professional divisions. There will be an address on "Mechanical Power Transmission Economies," by William Staniar, chairman of the board of advisory engineers of the association, and belting and transmission engineer of E. I. du Pont de Nemours & Co. This paper and the discussion of cooperation will follow the luncheon of the association.

Nearly 2000 fewer industrial accidents were reported to the Industrial Commission of Ohio in September, 1927, than in the same month in 1926, with a reduction of 125,000 days lost in that period. The greatest decrease occurred in the manufacture of metal goods, which had 900 less; blast furnaces, steel works, rolling mills and ore refining, 400 less; and machinery manufacturing and mining, 300 less.

Schwab Becomes Institute Head

Urges Cooperation in Inaugural Speech—Farrell, Campbell and King Add Emphasis to President's Plea—Tribute Paid to Late Judge Gary

CHARLES M. SCHWAB, chairman of the board Bethlehem Steel Corporation, succeeded the late Elbert H. Gary as president of the American Iron and Steel Institute at the fall convention of that association, which was held at Hotel Commodore, New York, Oct. 28. His election took place at a meeting of the institute directors the day before. Mr. Schwab is the second head of the institute, as Judge Gary had held the presidency continuously from the time the organization was formed in 1908 until his death.

James A. Farrell, president United States Steel Corporation, was elected vice-president of the institute, and Eugene J. Buffington, president Illinois Steel Co., was made a director.

The importance of cooperation among steel producers to protect the huge investments in the industry was particularly stressed by Mr. Schwab in his inaugural address at the opening session of the institute meeting Friday morning. The same point was emphasized by Mr. Farrell, who introduced Mr. Schwab, and by Willis L. King, vice-president Jones & Laughlin Steel Corporation, and James A. Campbell, president Youngstown Sheet & Tube Co., who also spoke briefly. Thus it was indicated that the policy that had been developed under Judge Gary's administration would be carried on with renewed vigor.

Says Mill Earnings Smaller than Interest on Gilt-Edged Bonds

"There is one thing that we must get into our minds," said Mr. Schwab in the course of his address. "We have spent vast sums in the development of our plants and the economies of operation. I attended a meeting of the Bethlehem company yesterday, and Mr. Grace showed that our company had spent $167,000,000 in four years in the development of our plants. We have made less money than we ever made before, notwithstanding the vast savings made in that direction. We have given away in other directions all the savings that we made in this vast expenditure of capital.

"Now the next great move of the steel industry must be the proper and economic distribution and selling of its product. I do not mean to say that we have anything in mind that is not in strict conformity with the regulations and laws of the country; that always must be fundamental in this institution. But I do say that destructive competition in an industry as large as ours, for the sole purpose of gaining a position in the industry, is ill advised and costly to the people who have their money in the industry. Think of the fact that eight or nine billions of dollars are invested in the steel industry, and on the average we are not earning as much on our investment as we would if we had put our money in gilt-edged bonds. That is a wrong condition. What we want in this industry is the sincere and hearty cooperation of everybody in it. As Judge Gary has so often expressed it, live and let live. These works are here and we have our customers and we have our trade and we have our position, and therefore we must try to respect our relative positions and see if we cannot do something toward the betterment of our returns, profits and business. That is the real purpose of the cooperative spirit that is necessary for the betterment of our business and the industry.

Cooperation as Necessary in Industry at Large as in Individual Business

"Now, gentlemen, I have never seen in any branch of life anything worth while accomplished that was not accomplished by cooperation. No individual, whether it be man or woman, can ascend to great heights of successful conduct of business or affairs who is not in cooperation with others. Mr. Farrell with his great industry, or Mr. Campbell or Mr. King, as an individual could do little, but with the association of loyal people about them they have been able to do much. And what is true of an individual business is true of a great industry. Therefore, let us regard ourselves as partners and directors of a great industry and do what we can for the upbuilding of this business in a proper, methodical and happy way."

Farrell Looks for Era of More Intensive Cooperation

Mr. Farrell, in introducing Mr. Schwab, pledged to the new president the undivided support of the United States Steel Corporation. He said, in part:

"The American Iron and Steel Institute has been in existence for 19 years. We are all familiar with the objects for which the American Iron and Steel Institute was formed, primarily to bring about a spirit of camaraderie in an industry which was not only potential but perhaps the foremost in the United States.

Institute a Monument to Gary

IN eulogizing the late Elbert H. Gary, Mr. Schwab said, in part:

"There is one thing we must never forget, and that is that Judge Gary was the father and founder of this great iron and steel institute. And if he never did anything else in his life, that should be a monument to what he has accomplished for American industry and American business ethics and conditions. . . . May his memory live as long as the iron and steel industry lasts. And the iron and steel industry will last for a long time.

"And in this connection, the directors yesterday felt that I should have the approval of the body of the Iron and Steel Institute to a suggestion that was made by Mr. King and seconded by others, that a suitable tablet be prepared as coming from the whole body of members of the iron and steel institute, to be placed at some suitable place to be determined in the future, as an expression of our admiration and appreciation of the work of Judge Gary for the iron and steel industry. Now, if we may have someone move the approval of that suggestion, I will put it to the vote of the assemblage."

The motion was made and seconded and unanimously carried by a rising vote.

There have been several critical periods during the existence of this industry. For 19 years—and I say this with great reverence, because I was an associate, perhaps more closely associated than many of us—we had as the president of this institute a man who was not only sincere in his endeavors to develop in every way the iron and steel business, but one who formulated its policies and who did his best to cooperate in every way.

"Speaking for myself alone, I think we are about to enter an era of more intensive cooperation, and with a resultant stabilization; and without infringing or contravening any law there ought to be an atmospheric disposition on the part of our people to be fair with one another. There is more in the iron and steel business than the manufacture of iron and selling it. We have got to dispose of some of the methods that we have been employing in doing business, and show a better and broader disposition. I for one believe that our business can be done on a reasonable basis.

"Now we have—and I say this with a sincere sentiment of appreciation—brought into this institute as president a man who can depend upon the undivided and entire support of the whole industry. Certainly, speaking for the branch of the industry that I am associated with, for Mr. Filbert and all of our other men who are here today, I pledge to the new president of the American Iron and Steel Institute the complete and undivided and honest support of the United States Steel Corporation."

Mr. Campbell recounted how he had gone to his hotel the previous evening more hopeful of what the institute will do for the iron and steel industry than after any previous directors' meeting. "I went to sleep in 5 min.," he said, "a thing I hadn't done in three months." He prophesied that the members of the institute would cooperate more effectively than ever before, doing the right thing both by the public and by themselves.

Mr. King also commented on the excellent spirit of cooperation shown by the officers and directors of the institute and asserted that there is a determination to make the steel industry "what we would want and what we deserve in view of our investment."

Past Optimism Justified, Says New President

A feature of Mr. Schwab's address was his assurance that as president of the institute he would endeavor to present the combined opinions of the directors rather than his own personal views. He made no apology for his consistent optimism, however, and showed how it had been borne out by the growth of the iron and steel industry in the past 45 years. In referring to the institute directors, Mr. Schwab said:

"We are going to start with complete cooperation in every way from the head down. And so what I have to say with reference to business conditions will be, as nearly as I can express it, the combined ideas or the individual ideas assembled of the board of directors of the Iron and Steel Institute.

"I gave the newspapers this morning a short statement of what we had to say with reference to the business forecast. I said to them: Be sure to so express it, because, as one newspaper man said to me, 'Anything that you express individually is already known and could not be anything but optimistic and would be no news. Now if you will get up there and make a pessimistic speech we will really give you a headline of news.'

Steel Production Doubled Five Times in 45 Years

"Now, my friends, I cannot do that. I have been an optimist, and I am afraid I cannot change. I do not think that I have been wrong in my optimism over this past 45 years. In 1886, when this country made 2,600,000 tons of steel, I believed it was going to grow; it doubled the next 10 years and doubled each succeeding 10 years, until today for the fifth time it has doubled, and we are making over 40,000,000 tons of steel. Therefore I offer no apology to the American Iron and Steel Institute for my optimism in the past, nor do I offer any apology for my optimism for the iron and steel business in the future. Whatever depressions may come at times and whatever lack of business, I still feel that the forward and onward trend in the development of our business is assured.

Had Urged King for Presidency

"I want to thank the directorate for their selection of my humble self for this office, the highest one that can come to any man in our industry or indeed in any industry. The directors well know that I urged my old and good friend, Mr. King, here, to be president of this institute by reason of his long 59 years of service in the iron and steel business. Willis and I have been associated since boyhood, and he is qualified, and everybody would have loved to have had him. But Willis declined because he felt that his hearing and age did not permit him to enter into the activities of this position."

Mixed Views on Business Outlook

Informal conversations in the corridors of the hotel reflected a rather common feeling of perplexity and uncertainty regarding the immediate business outlook.

Business Outlook Improved: Schwab

IT is usually thought wise to say something here about business conditions. We have been through a pretty bad time. We have not been running full. During this past week, however, orders have shown an improvement. And we, the directors of the institute, feel that the anticipations of better business in the future are being gradually realized. Speaking for the directors of the institute, and not for myself, we are optimistic of the future developments of our business. For myself I do not need to say anything.

Some members were disappointed at the failure of the chair to offer more definite assurances of improvement. Others were frankly doubtful of any betterment in this quarter in view of the approach of inventory-taking. The most reassuring views were voiced by Western members, who were enthusiastic about the recovery in farmer buying power and reported that implement plants are operating at a high rate. The new Ford model was a common topic of discussion, and the comment was frequently made that the volume of steel buying will be greatly influenced by the rapidity with which the Ford plants get back to a production basis.

Record Attendance at Banquet

Over 1600 were present at the banquet, which was held in the grand ball room of Hotel Commodore Friday evening. According to the office of the secretary of the institute this is the largest attendance on record. Julius Barnes, former president of the Chamber of Commerce of the United States, who was one of the speakers, declared that American prosperity is not a result of the war but is due to "our own natural resourcefulness."

"Our railroads," asserted Mr. Barnes, "are transporting 46 per cent more freight with the same crews than before the war; our electrical industry is 110 per cent more productive. Is this the result of the war? No, it is the result of American ingenuity and efficiency."

Sees Strength in Flexible, Elastic and Mobile Production System

The danger of blind faith in figures and the importance of discrimination and judgment in appraising business statistics were emphasized in an address by Virgil Jordan, chief economist of the National Industrial Conference Board, New York. He urged business men to throw off "hypnotic spell of the statistical

sleight-of-hand artist and the economic moonshiner" and to recover their "reliance and confidence in their original business instinct, intelligence and initiative."

"Since 1922, despite the Volstead act, the whole country, and many of its sober business men and faithful public officials, have become alternately intoxicated with the idea of our unprecedented prosperity and oppressed by the prospective katzenjammer of collapse. The prosperity of the past five years, though abundant, has not been in any way miraculous or beyond what might be expected of a nation in our position; it has not been by any means universal or perfect; and there is no inherent reason for believing either that by special dispensation it will last forever or that according to a fatal predestination it will collapse tomorrow.

"The secret of American prosperity is not merely mass production or mechanization. It lies in the fact that along with those we have developed a flexible, elastic and mobile productive system as a result of our abundance of liquid capital, our relatively small, increasingly flexible labor force, our wide market at high purchasing power and free from rigid class lines restricting consumption habits, and our mobile-minded and adaptable business and industrial management."

Abstracts of the technical papers and discussions follow:

Evolution of the Wide Strip Mill

BY STEPHEN BADLAM

DEVELOPMENT in the art of rolling wide, thin sections, as exemplified by the wide strip mill and the continuous sheet mill, is the outstanding achievement of the present decade in the history of the rolling mill. The rolling of wide, thin sections has developed along two distinct and originally widely separated lines.

1.—Rolling of strip, characterized by limitations in width and gage, rather than in length.

2.—Rolling of sheets, characterized by limitations in length, rather than in width and gage.

In 1924 strip was obtainable in widths up to 24 in. and in lengths as long as were demanded. Sheets were obtainable in widths as wide as were demanded (to about 54 in.) but were limited in length. Strip was produced from billets and slabs, and in units from 100 lb. up to 2000 lb. in weight, and was finished at delivery speeds up to 1000 ft. a minute. Sheets were produced from sheet bars, and in units from 12 lb. up to 70 lb. in weight, and were finished at delivery speeds of about 240 ft. a minute. Strips were always rolled single, while sheets were generally rolled in "packs."

That year a sheet mill was placed in operation which produced sheets by a continuous process, in widths up to 45 in. and in lengths up to 30 ft. In 1927 a product was placed on the market, in widths up to 36 in., having characteristics of both strips and sheets, but without the previously existing dimensional limitations of either. This new product approximates to strips in length, to sheets in width, and to both, in gage and physical characteristics. For the purposes of this paper it will be designated by the term "broad strip" to distinguish it from what has been termed "wide strip" and which ranged from 12 to 24 in. in width.

During the present year two additional broad strip mills have gone into operation, and a third is well under way, for the production of material 24 to 48 in. in width.

In its earliest stages, strip steel was merely a special product of the merchant bar mill, and was rolled, along with other thin, flat sections, such a pipe skelp, in the ordinary merchant mill. During the period from 1890 to 1900, however, increasing demand brought it into the specialty class and special mills were built for its production.

Production of pipe skelp, 4 in. wide and over, was the next to separate from the parent stem, and this was followed by thinner gages in the wider widths, which became known as band.

When the production of strip steel increased sufficiently to bring it into the ranks of a specialty, and mills were first built for its exclusive production, it was natural that they should be designed along the lines of the merchant mills with which their designers were familiar, and which had been producing the material.

American Tube & Stamping Co. 16-In. Mill

The first mill definitely designed for the production of 16-in. wide strip was built by the American Tube & Stamping Co., Bridgeport, Conn., in 1905. This was a semi-continuous mill. As originally built, the roughing consisted of two parallel continuous trains, the piece passing through two stands of the first train, then back through one pass of the same train, was transferred laterally and passed through four passes of the second train. It was then transferred laterally, or looped, through the two finishing stands. The last stand was three-high with a small middle roll, the bottom roll only being driven. One stand of the first continuous train and two stands of the second continuous train were provided with light vertical edging machines attached to the horizontal roll housings and driven through a slip coupling.

Raw material for the mill consists of slabs from 4¾ to 16 in. wide, by 1½ to 2 in. thick, and in lengths from 6 ft. up to 9 ft., heated in an oil-fired continuous furnace 10 ft. wide inside by 36 ft. 3 in. long.

In 1902 the Youngstown Sheet & Tube Co. built a

BORN in Boston, Mr. Badlam was graduated in 1900 from the Massachusetts Institute of Technology. From 1900 to 1913 he was successively foreman and then assistant superintendent of the merchant mill, the rail mill and the rolling mill departments of the Pennsylvania Steel Co., at Steelton, Pa. In 1913-1914 he was assistant chief engineer and superintendent of the billet and bar department at the Midland plant of the Pittsburgh Crucible Steel Co., and from 1915 until the United States entered the war he was chief engineer of the Pittsburgh Seamless Tube Co. He entered the United States Army in April, 1917, and later became a major. He is now practicing as consulting engineer in Pittsburgh.

mill for the production of skelp, which was in many ways the predecessor of the modern strip mill. This mill consists of a three-high flat rougher, followed by a vertical edger and three 16-in. two-high stands, in tandem, spaced far enough apart, however, so that the piece is never in more than one stand of rolls at a time. This mill showed the tremendous tonnage possibilities of the continuous type of mill, running as high as 20,000 tons a month of skelp from 7 to 22¾ in. wide.

[The speaker then traced, chronologically, the successive mills marking development or departures from previous practice. Space forbids going into details here, but the main features are covered in Table I.]

In 1925 the Weirton mill was remodeled for a second time and a new roughing drive installed. A new stand, No. 8, driven by a new 1500-hp., adjustable-speed, a.c. motor, was added before the first double-duo. A repeater was added between the second double-duo and the finisher, making the mill automatic throughout. A total of 8500 hp. is now employed on this mill. It is interesting to note the production and range of sizes of the mill during the three periods and their correlation to the horsepower.

	1916-20	1920-25	1925-7
Horsepower	4900	6300	8500
	Range of Sizes		
18-gage 0.049 in....	5 to 6½ in.	5 to 6½ in.	5 to 6½ in.
16-gage 0.065 in....	5 to 10 in.	5 to 10 in.	5 to 11 in.
14-gage 0.083 in....	5 to 13 in.	5 to 13 in.	5 to 17½ in.
12-gage 0.109 in....	5 to 15 in.	5 to 15 in.	5 to 19 in.
11-gage 0.120 in....	5 to 16 in.	5 to 19 in.	5 to 22 in.
	Production		
Best turn, 8 hr.....	185 tons	231 tons	275 tons
Best day, 24 hr.....	479 tons	644 tons	659 tons
Best month.....	8,365 tons	11,386 tons	13,658 tons

In the foregoing we have endeavored to picture the development of strip rolling from a maximum width of 7 in. in 1890 to 24 in. in 1925, and from a length of 100 ft. in the former year to a length of 500 to 1000 ft. in 1925. This development progressed in more or less gradual stages; the maximum width being: 1890 about 7 in.; 1899 about 10 in.; 1902 about 12 in.; 1905 about 16 in.; 1918 about 21 in.; 1922 about 24 in. There was also a fairly definite limit to the ratio between width and gage; in 1924, for example, the widest 16-gage strip that would be furnished on regular order was about 16 in.

Ashland Sheet Mill

From 1913 to 1921 the American Rolling Mill Co., with plants at Middletown and Zanesville, Ohio, had been conducting a series of experiments with the object of determining the fundamentals of sheet rolling. From these had been developed a plan for a continuous process of rolling sheets. Like previous attempts, the plan was developed from the sheet mill bias, and called for rolling in sheet lengths rather than in strip lengths. The old sheet bar, however, was discarded and replaced by a wider and thinner section.

Purchase by the American Rolling Mill Co. of the Ashland Iron & Mining Co. property in December, 1921, offered the opportunity of trying out these plans on a major scale. It was proposed to build a sheet mill which would take a 10,000-lb. ingot and, without allowing it to become cold, reduce it to 16-gage and heavier sheets, of the usual widths and lengths, and, after reheating, further reduce it to 22-gage and heavier.

Construction was commenced early in 1923; the first bar plate was rolled in December of that year; and the first sheet in January, 1924. This mill was described, in some detail, in THE IRON AGE of June 16, last, page 1731.

Butler 42-In. Mill

In 1924-5 plans were laid for the commercial production of broad strips in widths up to 36 in. and 18-gage and heavier. The steel plant at Butler, Pa., known as the Forged Steel Wheel Co., was consolidated with the allied interest, Columbia Steel Co., Elyria, Ohio. On Aug. 1, 1927, the ownership of the combined companies passed into the hands of the American Rolling Mill Co.

Construction of the mill was commenced early in 1926, the buildings formerly housing an 18-in. and an 18-in.-12-in.-9-in. merchant mill being utilized to house the new mill. Two producer-gas-fired, continuous heating furnaces, 14 ft. wide inside by 55 ft. long, belonging to the 18-in. merchant mill, were utilized to heat the slabs for the new mill. Slabs ranged from 12 to 36 in. in width, by 2½ to 5 in. in thickness, and from 6 ft. to 12 ft. 6 in. in length. This mill was described at page 1435, THE IRON AGE, May 19.

Development of the Four-High Mill

The earliest application of the backing-roll principle, as applied to the four-high rolling mill, of which we have any record, is in 1864, when rolls, 26 by 110 in., and two backing rolls, 32 by 110 in. were built. Except for the addition of roller bearings on the backing rolls, this was practically identical with the four-high mills of the present day. This mill is still in operation, having been changed to a universal slabbing mill by the addition of a set of vertical rolls in a separate housing. These, also, consisted of two working rolls and two backing rolls.

In 1916, the Lukens Steel Co., Coatesville, Pa., put in a 206-in. plate mill of the four-high type. This was a reversing mill with two 32-in. working rolls and two 50-in. backing rolls. It is today making the widest and heaviest plates made anywhere in the world.

In 1923 the International Nickel Co. purchased a mill for the Huntington plant, for rolling thin sheets of nickel and monel metal. This was designed on the cluster roll principle, with two working rolls of 12-in. diameter and four backing rolls of 24-in. diameter, all of approximately 40-in. length.

The results obtained from this mill were so remarkable, both in respect to thin gage, and to uniformity

Table I—Main Particulars of Mills Marking Development of Wide Strips

Year	Company	Width Rolled	Passes: Total	Passes: Edging	Monthly Tonnage	Horsepower
1905	American Tube & Stamping	16-in.	12	3	....	4,000 (a)
....	American Tube & Stamping—remodeled	16-in	11	3	5,300	4,000 (a)
1902	Youngstown Sheet & Tube	16-in.	11	3	20,000	4,260
1906	Cambria Steel	22-in.	5	2	7,000	.... (b)
1907	American Steel & Wire	14-in.	16	2	5,263	4,000
1910	Sharon Steel Hoop	14-in.	10	2	11,270	2,100
1927	Sharon Steel Hoop—remodeled	14-in.	11	2	....	3,300
1916	Weirton Steel	16-in.	11	3	8,365	4,900
1920	Weirton Steel—remodeled	....	..	..	11,386	6,300
1925	Weirton Steel—remodeled	....	..	..	13,658	8,500
1916	Trumbull Steel	16-in.	11	3	....	5,200
1920	Trumbull Steel—remodeled	16-in.	14	4	....	7,800
1916	American Steel & Wire	20-in.	13	2	2,658	7,350
1916	National Pressed Steel	18-in.	8	5 (c)	....	2,200
1919	Carnegie Steel	18-in.	11	3	17,219	9,650
1920	Illinois Steel (Gary)	20-in.	12	3	17,937	7,720
1922	Otis Steel	20-in.	13	3	15,574	11,000
1922	West Leechburg Steel	16-in	13	3	260 (d)	9,700
1925	Acme Steel	16-in.	14	4	301 (e)	12,200
1923	American Rolling Mill	30-in.	9	2		2,800
1923	American Rolling Mill—jobbing	30-in.	7	0	24,000	5,800
1923	American Rolling Mill—sheet mill	30-in.	5	0		1,600
1924	Columbia Steel	42-in.	9	5 (a)	16,000	13,000
1927	Trumbull Steel (f)	42-in.	14	3	....	13,000
1927	Weirton Steel	54-in.	12	3	....	16,600
1927	American Sheet & Tin Plate	.....	12	2	....	19,150

(a) Steam engine drive. (b) First electric-drive wide-strip mill. (c) Universal. (d) Best 8-hr. turn. (e) Best 10-hr. turn. (f) Converted from strip mill.

of gage across the sheet, that immediate attention was drawn to this type of mill. One additional mill of this type has since been built for the International Nickel Co. and four of the same type for the Cuyahoga works of the American Steel & Wire Co.

In the same year the Allegheny Steel Co., Brackenridge, Pa., installed an experimental mill of the four-high type, but without roller bearings, and has since added four similar mills equipped with roller bearings.

In 1925 the Rome Brass & Copper Co. installed a mill of the four-high type, equipped with roller bearings, which fulfilled every requirement, and was the model on which succeeding mills of this type were built.

There are now approximately 70 four-high and cluster mills, either in operation or building.

By the time the Butler Mill had started operation three other companies had either begun the construction of mills to produce this broad strip, or had definitely committed themselves to this course. The first to start the engineering work was the Weirton Steel Co., which has built a new plant for the production of the wide material. The first to start operations was the Trumbull Steel Co.; which was fortunate enough to be able to remodel an existing mill to produce the wider sizes. The third was the American Sheet & Tin Plate Co., whose mill is not yet in operation.

Advance in Rolling Mill Practice

The character and extent of the advance in rolling mill practice, represented by the new broad strip mills and by the continuous sheet mill, can perhaps best be appreciated by a statement of the maximum widths rolled in the various gages. Data are shown below, in which A to E represent the following classes or types of mills:

A—Hand-operated strip mill, 1900-05.

B—Tandem rougher, strand finisher, strip mill, 1905-20.

C—Tandem rougher, continuous finished, strip mill, 1920-25.

D—Four-high tandem finisher, broad strip mill, 1926-27.

E—Continuous sheet mill, 1924.

Thickness		Maximum Width, Inches				
Inches	BWG, No.	A	B	C	D	E
0.049	18	8	6	9¼	..	..
0.065	16	10	10	15	25	42
0.083	14	12	13½	18	..	..
0.109	12	..	16	21	..	..
0.134	10	..	17	23	..	..

It is too early to predict the future of this new type of mill in which, after half a century of separate development, the strip mill and the sheet mill have come together. But the best minds in the steel industry agree that it represents a tremendous advance in the art of rolling. That the operation will be a success, and that the broad strip, or continuous sheet, mill has come to stay, are generally conceded. But that it will entirely supersede the hand sheet mill is questioned.

There is a considerable tonnage of certain classes of sheets which, in all probability, will for years be made on the hand sheet mill. There is also a large aggregate tonnage, made up of small lots of special sizes, which will have no place on the schedule of the new mills. The economical limit of gage that can be produced on the continuous mills is today not lighter than No. 16 gage. This will mean that, for the present at least, a great part of the sheet tonnage produced will be open to other methods. Some will be produced by rerolling hot as in the Ashland system, some will be produced by cold rolling, and the remainder will be produced on the existing hand mills.

The old style sheet mill represented but a small investment, whereas the new type of mill represents a tremendous investment, say anywhere from $5,000,000 to $15,000,000. Only those companies best situated financially will be in position to enter the field, and reap the benefits of anticipated economies in operation.

Undoubtedly, as the older mills become economically unprofitable, which they would do eventually in any case, they will not be replaced and will gradually fade out of the picture. But, as has been the case with almost every other innovation, the new method will create its own demand for its product, over and above the existing demand, and the old will continue to maintain its existence alongside the new. Any disturbance of the existing order of things will be gradual rather than abrupt.

Discussion

A prime advantage of the old-fashioned hot sheet mill, according to C. W. Bennett, vice-president American Sheet & Tin Plate Co., Pittsburgh, is its flexibility. Broad strip mills produce heavy tonnage, but this is in some instances a weakness, for it is not always possible to accumulate an order book which permits continuous operation on a given gage and width. In his mind, the smaller mills may well supplement the newer tonnage mills, to produce moderate orders of odd sizes, and also to add gradually to capacity.

Are Old-Fashioned Mills to Be Abandoned?

This question is of vital importance to the 1400 hot mills now in existence in the United States. One modern strip mill can produce the same tonnage as 40 or 50 of the older ones. Whereas in 1924, the maximum width of strip of any gage was 24 in. (and 16-gage could not be produced wider than 16 in.), at present it is possible to run 36 to 42 in. wide in 14 and 16-gage sheet, of lengths far greater than the old hot mills can handle. Mr. Bennett questioned the accuracy of a $12 to $15 saving per ton, claimed for strip-sheet mills. His analysis shows that 80 per cent of the saving will be in labor. On the basis that 1 continuous mill can replace 50 old ones, and that 70 men will be required on a new mill, and 8 for each old one, a saving of 330 men will be effected. Computing their wages liberally at $8 per turn gives a labor saving of $2,640 for approximately 500 tons of sheet, or about $5.30 per ton. Any reduction in fuel and steel losses can not increase this figure much, so the greatest expected saving will be from $6 to $8 per gross ton of sheets.

Capacity of 4-High Mills

F. C. Biggert, Jr., president United Engineering & Foundry Co., Pittsburgh, agreed with Mr. Bennett that the cost per ton capacity of the continuous strip mill equals that of the old hot mills. He also estimates the labor at one-fifth the amount of the old mills, and notes that it need not be so highly skilled. Power requirements he places at two-thirds; pickling costs (since pickling is done on 16-gage metal just ahead of the cold mills) will be reduced to one-half, and the scrap losses will be only one-half as great. Without evaluating these factors in dollars per ton, it may be surmised that Mr. Biggert believes the $6 to $8 advantage will be somewhat bettered.

Four-high mills are said to be as good for cold rolling as for hot. In the earlier hot mills the working rolls were made of chilled iron, and the backing rolls of medium carbon steel. The former had a tendency to spall, and to leave "tail marks" on the strip. Consequently present practice calls for a close grained iron alloy for the working roll, and a high-carbon alloy steel for the backing rolls. Mr. Biggert places the maximum commercial width at 38 in. on 16-gage hot-rolled strip, delivered at a speed of 800 ft. per min. This figures to a maximum continuous capacity of 135 gross tons per hour, and consequently such a mill can be conservatively estimated to produce 40 to 50 tons an hour, hour in and hour out.

Cold rolls are made of hardened and ground alloy steel, with backing rolls of medium carbon steel (with a trend toward higher carbon and alloy). Cold rolling can be done to a maximum width of 30 in. in 24 gage material, at a rate of 100 to 200 ft. per min.; 16 gage can be reduced to 24 gage in one trip through a train of 4 or 5 stands at this speed, which figures to about 10 gross tons an hour. Eight tons capacity per train would be a conservative estimate. Mr. Biggert expects to see the speed of hot mills increased to 1000 ft. per min. and cold mills to 300 ft. per min. in the near future.

Comparing the first cost of plant to produce 40 tons per hour of 24-gage sheet, full finished, semi-finished or galvanizing stock from blooming mill slabs, Mr.

Biggert estimates the hot strip mill plus enough cold trains to cost $9,000,000. This should replace 40 sheet mills costing about $7,000,000 and a sheet bar mill costing $2,000,000. Consequently the first cost and capital charges of the wide strip mills are about equal to the mills, not continuous, which they replace.

Technological Problems of the Steel Industry

BY W. A. FORBES

ONLY the briefest summary of this 89-page paper by William A. Forbes, assistant to president, United States Steel Corporation, can be given. It might properly be entitled the technological accomplishments of the corporation, for he dwells more upon what has been done by his own organization than upon what is yet to be done by the industry. Lack of space prevents a review of the first quarter of his contribution, dealing with mining and washing of ore, and coking operations. As to blast furnace operations, Mr. Forbes notes that the output per furnace has doubled in the last 25 years. In the same time the average hearth diameter has increased from say 14 ft. to 22 ft. With heavy daily production has come the problem of handling fine ores, the recovery of dust from top gases, and the proper utilization of this recovered dust. More attention is also being given to the impurities which enter the iron. Nitrogen especially is thought to have a lasting effect upon metal, once it is included.

Direct Reduction of Ore

"This question of impurities in blast furnace iron," Mr. Forbes says, "brings us to the subject of the quality of iron made by the direct reduction of iron from its ores at low temperatures, resulting in a reduced iron product, which is free from such impurities including carbon, silicon, and also phosphorus and sulphur, when not inherently chemically combined with the iron, and above all free from nitrogen. A plant to demonstrate this question is now being constructed in this country on a sufficiently large scale to commercially demonstrate the various points involved. In the meantime there is evidence that the theories of improved quality which have been advanced for this process are sound."

Open-Hearth Furnace Construction

Among the notable changes in open-hearth furnace lines, Mr. Forbes notes the so-called "venturi" furnace, which gives higher velocity of the incoming air, more rapid and complete combustion, higher flame temperature and better concentration of heat at the surface of the bath. All of these advantages have been secured without shortening the life of the furnace, in fact one plant has operated consistently with an average of 400 heats per campaign, and with a coal consumption of 440 to 475 lb. per ton of ingots.

The sloping back wall, built on plates held by bent buck stays, is in reality an extension of the bottom upward at a 50-deg. angle. It has eliminated back wall replacements and decreased excessive radiation from that part of the furnace. This construction requires a wider furnace, and the suspended type of roof, which has been installed in certain instances, is still on trial.

Tendencies toward an increase in size of heat have been frequently checked by insufficient or slow charging machinery. If this equipment is ample, and ladle capacity is in keeping, the heat can be increased up to a size where 5 to 6 sq. ft. of hearth area will hold a ton of molten metal. Bearing in mind that depth of bath, type of scrap, percentage of hot metal, and kind of fuel all have definite bearing on the matter of output, the author suggests that a good check on the relative efficiency of a furnace may be made by comparing the tons per hour produced per thousand square feet of hearth area. This figure varies from 12 to 20 tons.

Data are given on plants having big furnaces, producing 140 to 250-ton heats on high scrap charges, and the statement is made that the quality of steel made is equivalent to that from a 50 to 80-ton furnace.

Waste-heat boilers are held to be worth their cost and upkeep when the plant needs more steam than that produced by blast furnace gas, and where coal is rather expensive. There are also certain collateral advantages to be derived from a boiler installation. For instance, the combustion rate is more uniform when forced draft fans are in use; and the furnace and attachments must be tightened up to prevent seepage of air. Such things are responsible for a 10 per cent reduction in the fuel required, or a saving of approximately 30c. per ton of ingot. Some of this is absorbed by interest, upkeep and operation of the boilers.

Improvements in Steel Melting

Statistics show a gradual increase in the amount of by-product tar and coke-oven gas used as fuel in open-hearth furnaces, displacing producer and natural gas. In 1920 half of the tonnage was made with producer gas; now the figure is 40 per cent. Coke oven gas alone is being used for about 4 per cent of the output, despite the former prejudice against this fuel of low luminosity. High-sulphur fuels are being use in places where low-sulphur pig or scrap is available. A general reduction in fuel consumption is also noted in the past 6 years; 500 lb. of coal per ton of ingots, for normal hot metal charges and ordinary steels, is now generally accepted as good practice.

Rimmed or effervescing steels have been found excellent for low-carbon plates, sheets or strip. It gives a steel of good ductility and superior surface suitable for deep stamping or welding. In the ingot, piping is entirely avoided at the expense of pronounced segregation, the latter requiring about 5 per cent extra crop and discard. It is thought that the evolution of CO in the mold cleanses the steel of gases and washes solid

BORN in England in October, 1876, Mr. Forbes entered the employment of Park Brothers, Pittsburgh, May 1, 1895, in the chemical laboratory. From Oct. 1 of that year until April 30, 1900, he was employed in the chemical laboratory of the Carnegie Steel Co., at Homestead. Later he became assistant chemist for the National Tube Co. at McKeesport, Pa., then chief chemist and assistant superintendent of the blast furnaces at McKeesport and Joliet, Ill., devoting a large part of his time to the study of by-product coke oven developments. Since July 1, 1908, he has had charge of the sale of all the coke by-products of the United States Steel Corporation's subsidiaries and has also specialized in technological studies. On Oct. 15, this year, he was made assistant to the president of the Steel Corporation.

non-metallic inclusions out of the metal. The furnace charge requires clean scrap with about 40 per cent of low-silicon, low-manganese pig.

Pig iron containing 1½ to 2 per cent manganese is now frequently utilized. This blast furnace product is unusually uniform in chemical composition, and therefore promotes uniformity in the open-hearth process and in the finished steel. It is worked with smaller slag volume and therefore involves smaller iron losses (the slags in fact are often recharged into the blast furnace as a high-manganese ore). High residual manganese in the bath means smaller alloy additions, and lessened oxide held in the metal. Manganese is thus a corrective rather than a cure.

Improvements in Bessemer practice are confined to the pouring of the metal. Crushed lime thrown into the ladle agitates the blown metal and liquifies the slag. The ladle is then held as long as possible for the oxides to separate and composition to equalize, and then teemed slowly through a nozzle of minimum size.

Tubular Products

To make the stronger casings necessary for mile-deep wells, much attention has been given to joints and couplings. Upset ends have increased the tensile strength of the joint to nearly 100 per cent of the pipe. Thread cutting on both pipe and couplings has been given minute attention and inspection, so that it now approaches a precision operation. Threads are also electrogalvanized to prevent seizing.

All these improvements have been associated with a change in material. For the wrought-iron couplings and the welded tube of soft open-hearth steel is now substituted a higher carbon and manganese steel, pierced and hot drawn into material with double the collapsing strength. Development of the hot drawn seamless tube has extended over several years, and has been associated with a 12-fold increase in production. The design, quality, and power of the equipment have been steadily improved and are vitally responsible for the present situation, together with the use of high-manganese steel, poured under controlled conditions into special ingot molds, and all surface defects chipped out of the billets.

Discussion

There is a short statement toward the end of the paper that should not go unchallenged; namely, that the steel industry was born of chemistry. This is not true, historically, for the industry had assumed large proportions and was meeting the needs of communities before chemistry became the handmaid and originator of industries. However, our industry was quick to seize upon the aid that chemistry could give, and now is using chemistry in almost every phase of its productive and research work, said Dr. G. B. Waterhouse, professor of metallurgy, Massachusetts Institute of Technology, Cambridge, Mass.

Great attention is drawn in the paper to the need of careful examination of the internal structure of iron and steel. This examination constitutes part of the science of metallography or physical metallurgy. Upon it the wonderful results obtained by heat treatment and in the use of alloy steels largely depend.

The splendid results obtained with the washing and treatment of coal on a large scale are remarkable. The value of clean coal, low in impurities, is so great in our industry that it is encouraging to read of such results. The section on the open-hearth process is most illuminating on the good results now being obtained. It is striking to see the increasing use made of coal tar as a fuel. This raises the question whether this is the best use to make of such a valuable raw material for the chemical and allied industries. The attention paid to residual manganese in the steel bath is fully justified and it is interesting to see, throughout the paper, the increasing care that is being given to the quality of the various products, in addition to tonnage output.

[*Abstracts of the other papers will be published later.*]

Fabricators Discuss Many Problems

Steel Houses, Fair Profits, Mill Competition, Skyscraper Congestion, Fireproofing, Rivet Strength, Bridges, Windbracing, Evoke Interest

ALL of the papers presented at the fifth annual convention of the American Institute of Steel Construction, held at the Carolina Hotel, Pinehurst, N. C., Oct. 25 to 29, found favor with the 230 members present, since it was true of the program of this gathering, as with former ones, that the committee in charge selected subjects which have a direct connection with the use of structural steel.

If, however, there were some papers discussed in the meetings and in informal groups, more than others, they were those of O. H. Cheney, vice-president American Exchange Irving Trust Co., New York, one of the speakers at the annual banquet on Thursday evening, Oct. 27, who in a discussion of competition saw nothing new in the battle for business between those engaged in a common line of endeavor, nor was the structural steel industry alone suffering from the new or so-called inter-industry competition; of Robert Tappan, Forest Hills, N. Y., who described the possibilities of the use of steel in the construction of homes and also presented a motion picture of the erection of a steel frame for a residence at Forest Hills; and that of W. C. Clark, S. W. Straus & Co., New York, whose paper "Economic Height of Buildings," proved to be an exhaustive analysis of the cost and income of skyscraper buildings, as well as an answer to the arguments against them. His paper was the result of the combined efforts of architects, engineers, building contractors and the manufacturers of building materials. It provided so many intimate details as to costs that it was declared to be the first real step which had been made in the direction of supplying steel fabricators with groundwork on which to figure the high buildings that must continue to go up in the cities where land values and taxes are so high as to make it imperative to build into the air, to insure the investor a fair return.

Business Sessions Well Attended

The several business sessions were under the direction of W. M. Wood, Mississippi Valley Structural Steel Co., Decatur, Ill., president of the institute, who will continue in that office for the coming year. Other officers and directors remain for another year, also, with the exception of Paul Willis, McClintic-Marshall Co., Chicago, who retired as a director and is replaced by J. J. Duffin, Duffin Iron Co., Chicago.

Another feature of the meeting was that, although reinforced concrete is regarded as a competitor of structural steel, it was one of the subjects on the program. To tell its story, one of its proponents, Alfred E. Lindau, president American System of Reinforcing, Chicago, was present by invitation of the directors of the institute.

A word about the sustained interest in the affairs of the organization on the part of the membership is called for by the fact that, although Pinehurst offers unusual golfing facilities, and many of the members had figured that as part of the reason for the trip, not one of the business sessions failed to attract at least 75 per cent attendance. French Lick Springs, Ind., Biloxi, Miss., and Colorado Springs, Colo., were mentioned as the places for decision as to the next annual gathering of the institute.

An interesting event of the opening session was that those present heard Secretary of Commerce Hoover, although he was not able to be present. The method employed was somewhat novel, since it called for the use of a talking machine on which his message

was recorded at his office. The record was brought to Pinehurst and, through the employment of radio amplification, the speech was given with all the clarity and volume there would have been if Mr. Hoover had been in the hall. (An abstract of this speech appeared on page 1167, last week.)

Urges Greater Support for Institute

IN his opening address President Wood again this year emphasized his belief that the institute, in its efforts to broaden the market for structural steel, is not getting the financial support from the manufacturers of plain material to which he thought it entitled. He complained also of the competition of the fabricating shops maintained by the steel companies. He said:

"The work of the institute certainly tends toward greater use of structural steel as a building material. Whether directly traceable to the institute or not, more structural steel has been used this year than last, and indications point to a further expanding market, under the stimulus of a carefully planned campaign to inform the public as to the merits of steel for use in bridge and building construction.

"Under the circumstances, the rolling mills profit first from this larger market, since they furnish the raw material, either to the fabricator or to themselves in the operation of their own fabricating shops. While I can report that most of the mills have been making financial contribution to our work, I regret that so far none of the major sources of supply has contributed more than a small fraction of the amount properly due from them—measured by the magnitude and the importance of the work we are doing, and by which they profit, and as compared with the assessments being made upon the fabricators themselves.

Unnatural Competition Set Up

"It is not, however, their failure to support our activities reasonably that causes the greatest concern. I refer to the prevailing system whereby the independent fabricator, the logical distributor of the product of the mills, is continually brought into competition with the fabricating units of the rolling mills on an unfair basis. I know of no other major industry which undertakes to deliver the finished product to the ultimate consumer except on a basis fair to all parties concerned. This unethical practice continues because of the keen competition between the mills in the effort to find a market for the plain material. But it should be manifest that this system does not create additional market, and that it does antagonize the fabricators, who individually and through the institute are doing constructive work in creating new markets.

"It seems to me that the condition in which the manufacturers now find themselves has been brought about by their failure to educate the public to the advantages of steel. As a result, competitive materials are being used, and the steel manufacturers in need of additional tonnage to operate profitably seem to feel that the way to get the necessary tonnage is to get it from their competitors, other manufacturers.

"It is not surprising that the steel industry is not making satisfactory profits. In the opinion of many, the crying need of the steel industry is progressive leadership. Cooperation and not competition is the life of trade. When the time comes that the rolling mills are ready to furnish the leadership necessary to cooperation with fabricators, in the interest of both, including joining with them in a plan for effectively telling the public about the product, then and then only will we be able to enhance our markets materially."

Wants Steel Sold at a Profit

Karl E. Vogel, vice-president Omaha Steel Works Omaha, Neb., in an address, "Proper Merchandising of Structural Steel," the paper being the report of the committee on better selling methods, observed that the sales department of any industry is organized not alone to sell the product of that industry, but to sell the product at a profit. In the structural steel industry, individual sales organizations are finding it not only difficult to sell at a profit, but in many cases to sell even at a substantial loss.

He expressed the belief that the fault is not with the sales organizations, but rather a reflection of the sales policies and conditions of the industry itself, for which management is responsible. Conditions adverse to profitable sales are those within the industry itself, through lack of proper sales policies to meet those set up by activities of competitive industries. Besides such activities as the institute may assume, it is imperative, the speaker declared, that the individual fabricator should possess a capable salesmanager, salesmen in sufficient number compatible with the volume of business offered, with plant capacity and the territory served; an engineering department that would cooperate with the sales department and capable of suggesting new or more economical details of construction; and set up an advertising budget or allowance for direct and indirect advertising; be an active member in local, district or national fabricating organizations. More careful selection of salesmen was urged, as well as more attention to uses to which structural steel can be applied. The paper was concluded by offering the following recommendations:

1. That each fabricator during the next 12 months pay particular attention to the proper organization of his selling forces, both as to personnel and training.
2. That each individual company establish the practice of holding regular salesmen's meetings.
3. That annual district sales conventions be fostered and encouraged in all parts of the country.
4. That the institute's sales manual be completed as rapidly as material is available and the funds permit.
5. That the general advertising campaign be approved and the work continued.

Fireproofing and Congestion

The second day's business session began with an address by Rudolph P. Miller, New York, "Fireproofing Structural Steel." Mr. Miller reviewed the history of the efforts that have been made in making buildings more fireproof and concluded his remarks by showing with lantern slides typical results of fires upon different types of steel structures.

He was followed by George H. Payne, commissioner of taxes and assessments, New York, who in a satirical vein pointed out that after having failed by every other argument to halt the erection of tall buildings in the cities, opponents of such structures now have adopted the congestion idea in their efforts to limit height. He said:

"There is no problem before the taxpayers of the large cities of the United States more important than that of congestion. But the endeavor to make the skyscraper bear the burdens of the ills of congestion is only to defer the best solution of the problem. It has been interesting to see the opponents of skyscrapers disregard the important relation of that kind of building to the assessed valuation. Any disturbance of building conditions in New York is bound to affect assessed valuations and the borrowing capacity of the city, without which the city would be unable to construct the many subways which it still needs before its transit facilities can be even partially complete.

"Taxable real estate on the island of Manhattan is assessed this year at $8,212,387,595, of which between $850,000,000 and $1,000,000,000 is on the skyscrapers and the land on which they are built. The subways are needed and the surface congestion now existing has less connection with the tall buildings than with inadequate transit facilities in the provision of which the tall buildings on valuable land will pay their share. The problem would be more speedily remedied if there were less divergence of view as to the causes."

Working Strength of Rivets

C. R. Young, professor of structural engineering, University of Toronto, had an interesting paper on the tensile working stress for rivets. While the subject of standard specifications for rivets has had some attention, and some tension tests were made by D. C. Tennant at the University of Toronto in 1900, and by the Verein deutscher Brücken und Eisenbaufabriken in 1912, only a few specifications make any attempt to prescribe working stresses for rivets in tension. Professor Young in his paper details the results of a series of tests made during the past summer under the aus-

pices of the School of Engineering Research, University of Toronto, on rivets in pure tension, when subjected to a combination of tension and flexure and when subjected to a combination of tension, flexure and shear. The tests were conducted at the Toronto works, Dominion Bridge Co. The conclusion is that the working stress on rivets in tension should depend both on the diameter of the rivet and upon the eccentricity with which tensile force is applied. Upon this basis, a formula has been devised such that a factor of safety of 4 is maintained with respect to the minimum values obtained in the tests. At the same time, the results obtained from other tests have been carefully considered in devising the formula. For cases of pure tension and for cases of a combination of tension and flexure, with the angles of thickness comparable to those used in the tests, the formula for permissible tensile stress is as follows:

$$p_t = 21{,}000 - 8000\ d - 5500\ \sqrt{e}$$

in which

p_t = permissible tensile stress on rivets
d = diameter of rivet in inches before driving
e = eccentricity of loading on rivet in inches.

In determining the eccentricity, it was assumed, as a result of consideration of the nature of the flexure of the outstanding legs of the connected angles, that eccentricity should be about two-thirds of the value of the gage for the outstanding leg.

Robert D. Kohn delivered a paper, "Greater Safety in Building Construction," discussing safety of the structural design and security in the completed structure. He referred to some countries which make architects and builders financially liable for the soundness of their work. Clyde T. Morris, professor of civil engineering, Ohio State University, Columbus, read a paper on "Practical Tests of Wind-bracing." He reported a method of analysis which avoids the ponderous calculations of some developed formulas.

The utility of concrete was the keynote of an address by Alfred E. Lindau, president American System of Reinforcing, Chicago. He described the many uses to which it had been put prior to the Christian era, without reinforcement, and carried the story of its use down to present times. At the conclusion of his talk he presented lantern slides showing numerous buildings and bridges of concrete construction. Not the least interesting of the views were those of structures, in which colored cements had been used.

Standard Steel Units for Houses

"IT is perfectly possible," said Robert Tappan, in his talk "Steel in Residences," "to fabricate steel frames for the small house or cottage. The real question is how economically can the work be done and for how low a price can the completed house be sold to the public. Obviously, a steel-framed cottage, properly inclosed, insulated and equipped, represents a better investment to the house-buying public than a similar house with similar equipment, constructed of wood or of wood and masonry.

"Such a house, in New York at least, need not cost more than one of wood. In building a $5,000 wooden house today, 40 per cent represents the average cost of materials and 60 per cent the cost of labor. A steel-framed house of similar capacity and equipment would cost about 6 per cent more for the material. But, with proper organization and experience, the labor item should, by comparison with wood, drop to 50 per cent or less. Expressing the idea another way: If the materials for a $5,000 wooden house cost $2,000, those for a steel-framed house of like capacity would cost $2,300; but the labor on the steel-framed house would be $2,500 or less, against $3,000 for that in a wooden-framed house.

"I have reduced the floor plans of four, five, six and seven-room houses to three simple rectangles, 20 ft. x 24 ft., 20 ft. x 28 ft. and 20 ft. x 32 ft. These rectangles, it will be observed, are in multiples of 4-ft. squares. The structural steel members required to frame the walls, floors and roofs of these basic plans can be highly standardized and can be made almost 100 per cent interchangeable."

A motion picture of the erection of the frame for one of the houses designed by Mr. Tappan at Forest Hills, N. Y., was shown after the talk.

In response to questions, Mr. Tappan said that the steel required for these small homes might be safely estimated at one ton per room. He admitted that just now it would be impossible to provide steel economically for any house that might be designed, stating that economical plans are based upon standardized designs, which, however, lend themselves to a large number of exteriors. He expressed the belief that there is a big market for the standard steel-framed house, of which fabricators should avail themselves. He thought that War Department barracks, and emergency houses erected by the Red Cross in times of disaster, were fields which the fabricators should cultivate, since the barracks and emergency structures often are temporary and, built of steel frames, could be easily erected and taken down.

Good Cost Finding System Urged

In his talk, "Pricing Structural Steel," W. R. Basset, of Miller, Franklin, Basset & Co., New York, said that one of the great troubles, not only of the structural steel industry but all others at all competitive, is an altogether too frequent tendency, on the part of those whose duty it is to make prices, to think too much in terms of what the other fellow might quote rather than to base prices on costs. The only excuse for a price below costs is found when the loss would be less than if the plant had to shut down for want of the order. Urging the adoption of better business methods, which would include good cost finding systems, he said:

"I have seen fewer good, usable and reliable cost systems in the structural steel industry than in any other industry except coal mining. Even in the few plants where fairly reliable cost information exists, it is generally disregarded in favor of a sort of spiritualistic or astrological star-gazing system of trying to fix a price, not on costs, but on what the sales force thinks a competitor is going to quote."

Dr. Ralph Modjeski, New York, made out a strong case for structural steel as the best material for bridges, in his talk at the morning session on Oct. 26. While granting concrete a place as a protection of steel against corrosion, he also drew attention to the growing use of alloy steels in bridge construction and said that there is a place for a cheap stainless steel.

Detailed Cost Figures on High Buildings

W. C. Clark, S. W. Straus & Co., aroused considerable interest with his description and detail of an imaginary building on a suppositionary site in the central district of New York. This site, 200 ft. by 405 ft., on land having an approximate value of $200 a sq. ft., would contain a group of eight buildings varying in height from eight stories to the 75 stories in a tower building located in the center of the group. The cooperation of leading architects, engineers, contractors and building managers was obtained in checking plans and specifications and in estimating construction and operating costs, gross and net income, etc., to make the investigation a conclusive study of the economics of tall buildings.

The estimated building costs varied from $5,300,000 for the 8-story building to $21,800,000 for the 75-story structure, with the cubic foot costs ranging from 55.6c. to 68.3c. The cost per square foot of rentable area ran from 76.9c. for the 8-story building to $1.57 for the 75-story tower; plumbing from 56c. to 76.5c. and heating and ventilation from 65.8c. to 78.5c. Steel was estimated to cost $1.02 per cu. ft. in the 8-story structure, $1.46 for the 37-story building and $2.23 for the 75-story tower. The investment per square foot, including land and indirect costs, from $42.80 for the lower building to $23 for the tower building. The return in income was estimated to run from 2.8 per cent for the lower building to 9.1 per cent for the tallest structure. All of the income calculations were estimated on full occupancy of the several buildings.

Intra-Industry Competition Not Peculiar to Steel Construction

SPEAKING at the banquet on Thursday evening, O. H. Cheney reviewed at some length the competition which all industries are experiencing, not only within the industry, but from competitive products. Coming down to the mill competition of the steel

fabricators, he said that it is exactly the same sort of competition which the grocery wholesaler has from the manufacturer and the textile jobber gets from the mill. Continuing, he said:

"I would like to point out that you are feeling a well-nigh universal trend and not what you may consider the 'cussedness' of a few steel mills. Let us reason this problem of inter-distributer competition in cold blood. What function has the fabricator in the system of structural steel distribution? It is his function to supply the individual job with exactly the right steel, in the right quantities and according to specifications, when and where it is needed. He is ready to undertake any and every job in his line in his economic territory, and to give every essential service to his customer.

"Can anybody else perform these functions? Yes, by becoming a fabricator. But the question is, can the hot steel producer become a fabricator? Well, would it be possible and fair for the fabricator to operate a steel mill? The question of possibility answers itself and the question of fairness does not enter into it. You believe it is unfair for the mill to sell direct to the consumer and to cut you out. But it is not unfair to do business by any more efficient way and the question is, whether mill selling is more efficient.

"'Direct from factory to you,' sounds economical, but often it is not. Somebody has to break up big production into small orders and, in the case of the steel fabricator, has to manufacture as well. The mill can perform these functions if it performs all of them. If the mill does everything a fabricator does, then it is a fabricator. If the mill undertook to bid on any and every job instead of just picking off the easy ones, then mill competition would be merely normal competition.

All Must Live on What Can Be Had

"The effect that mill competition has on the fabricator is only one side of the problem. The more important is the effect on the whole steel industry, and therefore on the mill. If the mill succeeds in making it impossible for the fabricator to make a decent profit on his year's work, the mill may find itself without fabricators. Then it would have to undertake all of the functions of the fabricator. Until the mills are ready to do this it is short-sighted to sell direct, just as any inter-distributer competition is uneconomic unless the distribution system of the industry is entirely reorganized, or unless, through mergers, companies representing the different factors in the industry are integrated into one complete and thorough service organization.

"What can be done about mill competition? You can sit and bury your heads in your hands and let the mills pick off the good jobs while you slash prices on others, to keep your organization going. Some time ago an organization of grocery wholesalers in the West tried another answer. They got together and refused to do business with any manufacturer who sold through chain stores. For some reason, the Federal Trade Commission was not sympathetic and mistook the righteous indignation for a boycotting or blacklisting."

Steel Prices Below General Average

After pointing out methods which the meat, cement and other industries have used in the effort to combat inter-industrial competition, Mr. Cheney observed that volume is not the great need of the structural steel business, or of the steel industry as a whole. American business in general has gone "volume crazy." A growing proportion of businesses are not making money and the profits of those which do are showing a declining tendency. The steel industry has put $1,650,000,000 into new plant and equipment since 1914, and yet the profit per ton of steel is practically the same now as it was then.

One reason is that prices of all building materials averaged together are 73 per cent above 1913 levels, while structural steel is only 30 per cent higher. And structural steel, since its very thorough deflation in 1921, has been relatively lower than any other building material. The speaker urged promotion of structural steel frames for small houses, more research and advertising and a bettering of relations between the steel mills and fabricators,

Opposing Too Many Steel Sections

Friday was recognized as Members' Day, and both the morning and afternoon sessions were devoted largely to discussions of company and industry problems, as to costs, competition, credits and the practice, which has become common, of fabricators making more than one bid on a particular job. The increasing number and variety of structural steel sections had a good deal of attention and a resolution protesting against this tendency was adopted. The resolution:

> Whereas very definite progress has been made through the effort of the Department of Commerce in the elimination of waste in industry, for the ultimate benefit of the public by simplified practice;
>
> And whereas the American Institute of Steel Construction has contributed to this program in many ways through its efforts at standardization;
>
> And whereas these worthy efforts are unfortunately dissipated by the hot mill industry, in the constantly increasing number and variety of structural steel sections placed on the market;
>
> Therefore, be it resolved by the members of the American Institute of Steel Construction in convention assembled that the elimination of many structural steel sections is practical and desirable, and the hot steel industry is urged to confer and cooperate with the United States Department of Commerce in an effort to reduce the number and variety of structural steel sections now being marketed;
>
> And be it further resolved that a copy of this resolution be sent to each of the mills rolling structural sections, and to the Honorable Herbert Hoover, Secretary of the United States Department of Commerce.

To Build Hot Strip Mill at Cuyahoga Works

A new hot strip mill will be erected by the American Steel & Wire Co. at its Cuyahoga Works, Cleveland, and other mill additions will be made increasing the present rolling capacity 80,000 tons per year. The new No. 5 mill will consist of four 14-in., four 12-in., and five 10-in. stands, providing 13 flat passes, and two edging stands. It will roll strip 1 in. to 3 in. wide and down to 22 gage from billets 1½ in. square and larger.

This mill will take the place of the present No. 2 hot strip mill and will roll about the same range in sizes except that it will have a capacity for rolling slightly thinner and narrower material than the No. 2 mill. It will have a larger capacity, or 60,000 tons per year, as compared with a 40,000-ton capacity of the No. 2 mill and will roll material to closer tolerances than the present mill. All the company's hot strip mill products are used for cold rolling and economy in operations will be effected by rolling the strip thinner in the hot mill, so that less reduction will be required in cold rolling. The mill will be built by the Morgan Construction Co., Worcester, Mass. A new continuous heating furnace will be erected for this mill. The mill will be housed in a new building 70 x 480 ft., work on the foundations for which has started.

The present No. 2 hot strip mill will be converted into a rod mill and its capacity increased from 40,000 to 60,000 tons per year. This is a continuous mill with several looping passes on the finishing end. These finishing stands will not be changed but three additional stands will be added for the continuous rolling of rounds in sizes of from 5-16 in. up to 1 1-16 in. diameter. The looping train will be used for rolling shapes, including square, hexagon and thick flat bars. All the product will be reeled into coils.

The present reheating furnace for the No. 2 mill will be lengthened to handle 30-ft. billets instead of 16-ft. lengths as at present. Another continuous billet heating furnace will be erected to supplement the four furnaces that now serve the billet mill, and an additional gas producer will be provided.

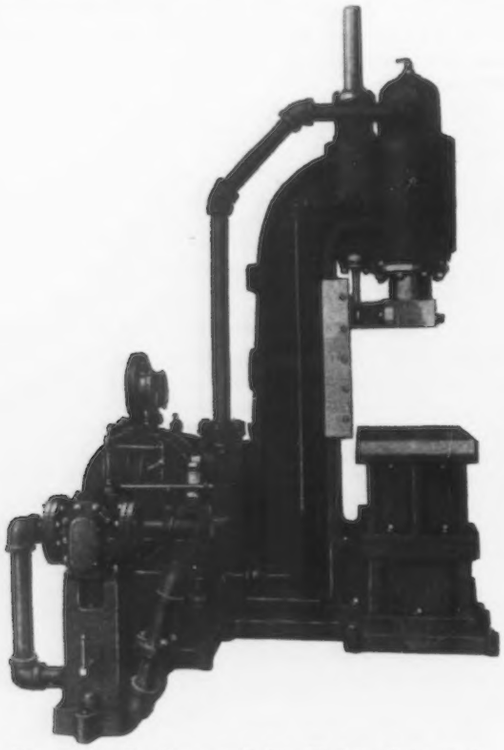
New orders for steel boilers in August are reported by the Department of Commerce at 1304, with total heating area of 1,146,252 sq. ft. This is a sharp reduction from the 1,568,536 sq. ft. of August and represents the smallest total in some months.

HYDRAULIC STAMPING PRESS

Flexible Unit Arranged for Automatic Operation at Speeds Up to 42 Strokes Per Min.

THE Hydraulic Press Mfg. Co., Columbus, Ohio, has developed the hydraulic stamping press here illustrated, which has been named the H-P-M Hi-Speed.

It is intended as a multiple-purpose pressure machine, and under automatic control it may be employed for metal stamping operations, including blanking, piercing, forming, drawing, horning and wiring. Under manual control it may be used for miscellaneous shop pressing operations, such as assembling, forcing, broaching, bending and straightening. Speed of 42 normal working strokes per min. is claimed.



The Press Is Arranged for Either Automatic or Manual Control

Flexibility is a feature, the machine being adapted for deep drawing and on other work requiring a range of stroke from a fraction of an inch up to 18 in. It also operates over a wide range of adjustable pressure. It is stated that stampings requiring several distinct operations frequently can be completed in a single stroke on the machine. This, it is pointed out, is due to the long stroke available, with the ability to build up pressure at any points along this stroke. The automatic feature incorporated is stressed as a source of saving in that it prevents machine or die breakage.

The frame of the machine is a one-piece casting and working parts are of simple design. The latter consist of the main ram, a plain cylindrical casting, and the auxiliary differential pullback ram. The tool holder, of standard design, and slide are carried by the main ram, attached to the lower end. The design provides for accurate alinement of the moving parts. The bolster plate is mounted on a removable sub-table which has a V-opening accessible from the front. The press bed has a rectangular opening through to the base, providing space for suspending from beneath the bolster hydraulic cylinders or other devices for operating ejectors, blankholders, etc. A horn is provided for the various horning and wiring operations and clearance is provided for handling work of large diameter on the horn, by removing the sub-table.

The power unit consists of a "hydro-electric" combination made up of an electric motor with double-ended shaft direct connected through flexible couplings with two rotary type hydraulic pumps. The entire unit is mounted on a reservoir base which holds the entire supply of pressure fluid required. All devices necessary for the automatic control of the press are located on the power unit. Hydraulic power is transmitted to the press through two pipe lines. The pipe lines and a small tension rod connecting with a starting trip on the machine are the only connections between the power unit and the press. Their location relative to each other may therefore be varied to suit installation requirements.

In production work the press is under automatic control. Depressing the foot treadle to its extreme position serves to start the automatic cycle. The steps in this cycle are: Press closes at fast speed; automatic shift to the slower full load speed as the resistance of the work builds up; automatic regulation of maximum pressure, the limit of which is adjustable to any value from the full load rating to one-fifth that amount; automatic reversal of direction of travel as soon as the limiting pressure is reached; and return of press to initial upper position, where it stops. The latter position is adjustable to any point.

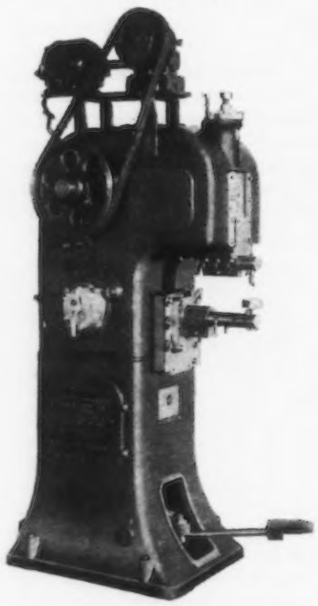
For manual control, the single operating treadle may be used, both for controlling the direction and speed of the ram movement. The further the treadle is depressed, the faster the downward movement. Releasing the treadle will cause the press ram to move upward and stop. Thus the ram may be advanced to the work rapidly, slowed up and finally stopped, which control is of advantage in setting up a die or in performing special pressing operations.

The press closes at a maximum speed of 440 in. per min. and returns at the same rate, completing 42 strokes per min. of 2½ to 3 in. each, or longer or shorter strokes with proportionally slower or faster frequency. The entire operating control is through the single treadle.

The machine illustrated is the No. 8-O. S., the maximum pressure capacity of which is 75 tons. Other standard sizes and capacities will be made.

Welding Press Employs New Principle

A welding press that is a combination of an automatic spot welder and a punch press has been brought out by the Gibb Welding Machines Co., Bay City, Mich. It differs materially from an automatic spot welder both in design and work accomplished. A new principle in spot welding is employed through the use of a special type of transformer and precisely timed automatic switch, with the use of which it is stated that spots are made in one hundreth part of a second as compared with the usual time of one second, and that welds can be made at the rate of 200 or more spots per min. In addition to the increase in speed of operation other features claimed for the press include the making of welds without causing depressions in the



The Machine Is a Combination of an Automatic Spot Welder and a Punch Press. Welds are made at the rate of 200 or more a minute

surface, warpage and discoloration. The weld is made before the heat has an opportunity to soften the outer surfaces of the sheet.

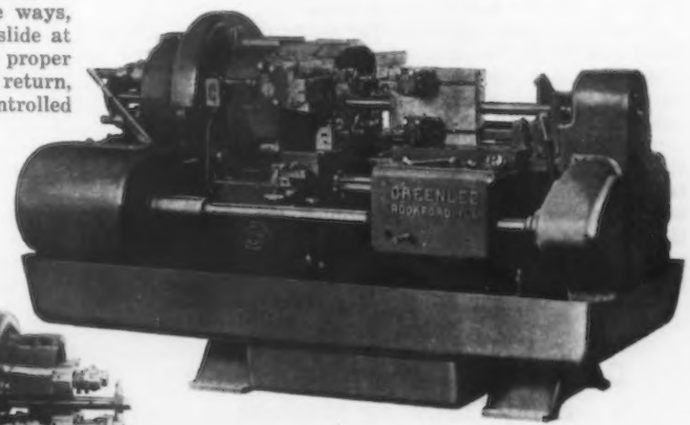
The press has a smooth toggle action which quickly brings the welding points lightly into contact with the work and this is followed by a final forging pressure which can be applied without limit. It is stated that there is no hammering of copper points.

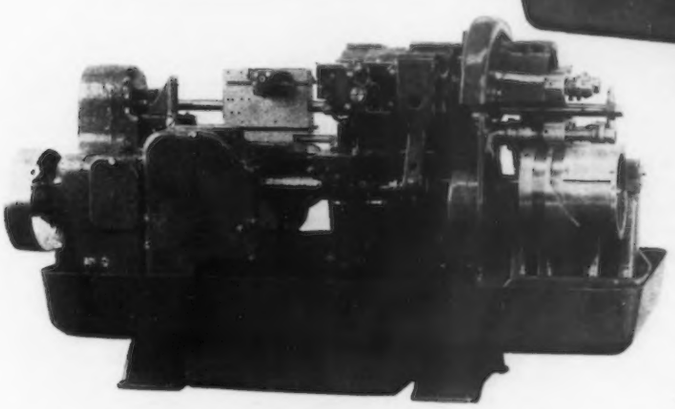
Fields indicated for the use of the press include the more difficult and precise welding of light to heavy parts; welding finely polished surfaces such as automobile bodies; welding spouts to bodies of oil cans, kitchen utensils, etc.; welding rivets, pins or other shaped pieces on ends to flat surfaces; welding builders' hardware, such as locks and catches and other pieces and welding non-ferrous metals such as brass and aluminum. One special application is in attaching ears, clips or lugs to containers. For this work a special double-acting welding press with which two spots are made at one stroke is employed.

New 1¼ x 6-In. Four-Spindle Automatic Screw Machine

Recent additions to the machine tool line of Greenlee Brothers & Co., Rockford, Ill., include a four-spindle 1¼-in. x 6-in. automatic screw machine, in which are incorporated some mechanical movements claimed to be unusual in screw machine design.

The tool slide, a section of which is an inverted T, is operated through its cycle by a rack, attached to the slide and intermittent gearing between the ways, combined with a plate cam for positioning the slide at the ends of its stroke and keeping it in the proper relation to the intermittent gearing. The quick return, approach and feeding cycle of the slide is controlled by adjustable dogs operating high and low speed clutches.





The General Arrangement of the Screw Machine May Be Noted From the Front View at the Right and the Rear View Below

Each spindle is mounted on four tapered roller bearings with the drive gear carried in the center. The spindle carrier is a one-piece casting, with provision for eliminating end motion for accurate cut-off duplication. Indexing of the spindle carrier is by a combined Whitworth crank motion and a Geneva movement driven from the main gear box. The locking pin is securely gibbed in the spindle carrier housing. It is a wide, flat wedge located in the center of the spindle carrier in an adjustable hardened and ground seat. The seat is straight on one side and tapered on the other.

Indexing and stock feeding takes place between the fourth and first positions, leaving the fourth position open for end operations as well as cutting off.

The chuck-closing spools mounted at the rear of the spindle are made in three pieces, consisting of a bronze body free on the spindle, on which is mounted a rotating spool and hardened sleeve. The entire unit is automatically lubricated through the spindle. The spool, instead of rotating in the operating shoe, rotates on its bronze body and has a rolling action in the shoe when indexing. The stock pusher ring is also free to rotate on the feed tube. The shoes are carried on parallel motion arms with rollers engaging drum cams for movement. The stock pusher shoe is arranged with compensator spring to prevent breakage of stock pushers when stock is exhausted.

Four cross slides are provided, one for each spindle, mounted on bearing brackets attached to the frame and spindle carrier. Movement is through rack and segment arm controlled by small pick-off cams and two rollers for positive travel in both directions. Independent feeds are available for all four slides with cams interchangeable for each position. The maximum travel of the slides is 1¼ in.

All gearing and shafts in the speed and feed box, mounted at the end of the machine, are of alloy steel heat treated and mounted on either ball or roller bearings. Pick-off gears are provided for spindle speed and feed changes, these being accessible through doors in the box. Spindle speeds range from 250 to 1200 r.p.m. with feeds from 0.002 to 0.015 in. per revolution of the spindle. An adjustable safety clutch is mounted on the main worm drive shaft which functions in case of overload on the tool slide.

A geared oil pump arranged for convenient removal for inspection is located in the bottom of the speed box. The oil is pumped from a reservoir to practically all moving parts of the machine. A glass tube provided on top of the head indicates operation of the oiling system. A self-contained coolant system is employed, eliminating all piping to tools carried on the tool slide on cross slides.

When individual motor drive is required the motor is mounted on the front of the bed below the spindle carrier. Power is transmitted to the speed box by a housed longitudinal shaft at the front of the bed. The machine may also be arranged for single pulley belted drive.

The Carnegie Steel Co., Pittsburgh, has published an addition to its prior booklet on Carnegie beam sections giving data on heavier weights of CB 146 14-in. column sections, advancing by 20-lb. increments from 325 to 425 lb.; additional lighter weights of CB 146 at 106, 96 and 86 lb.; a new 12-in. constant-depth section with 9-in. flange width in weights of 70, 65, 60 and 55 lb. to be called CB 123 A; modification of the 12-in. constant-depth section CB 124 increasing the flange with from 10 to 10½ in., but retaining the old weights of CB 124, which is now obsolete and cannot be obtained. The modified section will be called CB 124 A.

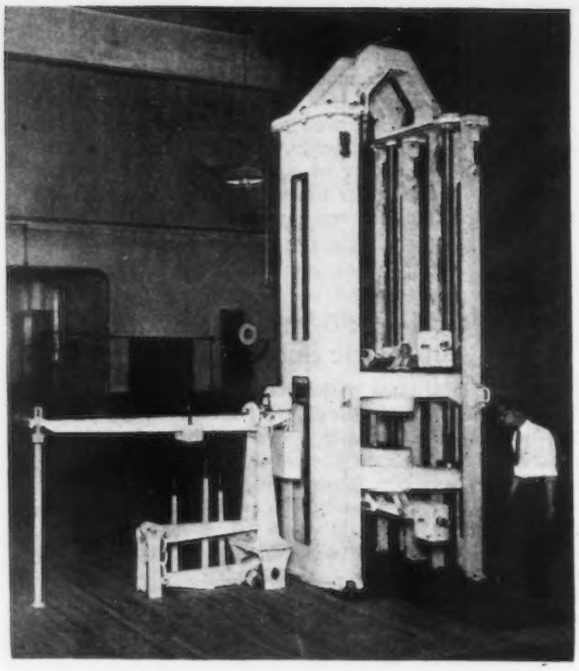
The Polish Government has officially announced that the reduction of duties on all machinery not produced in Poland from the schedule of 100 per cent to 20 per cent will be prolonged until March 31, 1928. After that the regular schedule of the tariff will be effective.

Pittsburgh Testing Laboratory Installs Large Testing Machine

A new universal 3-screw vertical-type testing machine, with ultimate or maximum capacity of 600,000 lb., has been installed by the Pittsburgh Testing Laboratory. This is said to be the largest universal type testing machine in any commercial physical testing laboratory in the United States or Canada. Some idea as to its size may by gained from the fact that the machine, completely assembled, weighs approximately 30 tons. It measures 16 ft. from the top of the columns to the floor line or base. The distance between the screws is 40 in.

With the top or fixed head raised to its upper position, it is possible to crush or compress specimens 10 ft. 6 in. long and to conduct tensile or pulling tests on specimens 8 ft. 6 in. long. The gripping jaws are designed to take flat bars up to 3½ in. thick by 6 in. wide, and round bars up to 5 in. in diameter. The platen or base for supporting the work under test measures 10 ft. 6 in. in length and has two slots running the entire length, for holding down bolts.

There is ample capacity for determining the ultimate crushing strength of massive reinforced concrete specimens in the form of piers or beams, as well as tile and brick piers, and fabricated steel structural specimens. It will be capable of determining the end compressive strength of tubing and oil well casing in the largest sizes. It will be possible to determine the tensile strength of long steel bars, oil well casing and welded specimens, and to determine the strength of the larger diameters of wrought iron and steel shapes as rolled, of chains and cables and links used for hoisting purposes, as well as innumerable other materials requiring excessive loads to rupture or compress to failure. It may be used, also, to test heavy locomotive and car parts, such as boilers, side frames, draft rigging, heavy forgings and large elliptic springs.



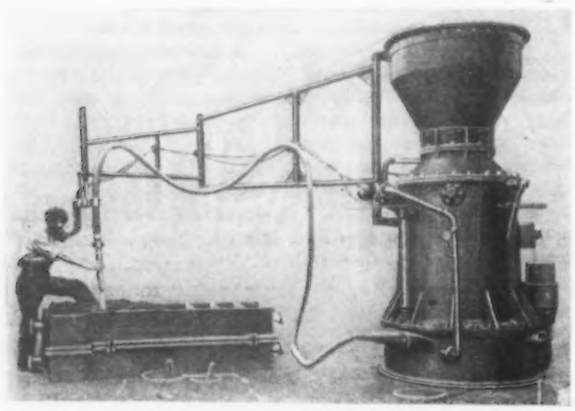
Universal Testing Machine of 300 Tons Capacity, Designed to Handle Full-Scale Beams, Etc.

Compressed Air Used in German Sand-Throwing Machine

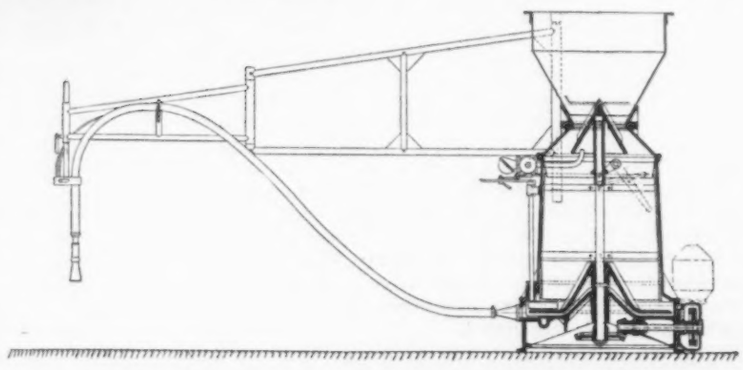
A molding machine that employs compressed air to throw molding sand into the flask has been developed by the Baden Machine Works (Badische Maschinenfabrik), Durlach, Germany. The process is said to insure a high degree of uniformity in the compression of the sand. Moreover, the amount of compression may be varied within wide limits to suit the kind of molding sand used and the character of the mold. This is accomplished by regulating the air pressure and the relative quantities of sand and air used. The blowing nozzle, which hangs from the end of a flexible tube, is adjustable through a wide arc so that the sand may be uniformly distributed along steep sides and under flask bars.

The sand-throwing machine consists of a pressure vessel of 2 cu. yd. capacity separated by a stop valve from a storage vessel above. The pressure vessel contains a distributing plate with an adjustable stripper. The distributing plate is rotated by a motor integral with the machine. The stripper strips the sand off the plate into an air jet, which blows it into the hose connecting with the discharge nozzle. The nozzle, which is of special design, throws a continuous stream of sand and is said to compress it to such a degree that no subsequent hand ramming is necessary, even on the upper face of the mold.

The machine delivers 4 to 12 cu. ft. of sand per minute. The amount of air drawn into the machine ranges from 175 to 280 cu. ft. per minute according to the density and quantity of sand discharged. The necessary air pressure varies from 21 to 35 lb. per square inch. With a flexible tube 26 ft. long a pressure of 28 lb. is usually satisfactory. The hose, however, may be extended to a length of 65 ft., greatly increasing its field of action. Neither the tube nor the blowing nozzle is subjected to undue wear, it is stated. The machine is made in both stationary and portable models.



A Sand-Throwing Machine in Which Compressed Air Is Used as the Propelling Force. The sand is blown through a flexible hose which is suspended from a hinged radial arm. The machine is made in both stationary and portable models



Sand Is Fed from a Storage Hopper through a Valve to a Pressure Vessel Containing a Centrifugal Distributing Plate and Stripper. As the plate rotates the sand is stripped off into an air jet, which blows it through the tube to the discharge nozzle

Planer-Type Horizontal Boring, Drilling and Milling Machine

Precision with increased capacity is claimed for the new planer-type horizontal boring, drilling and milling machine developed by the Giddings & Lewis Machine Tool Co., Fond du Lac, Wis., and illustrated here. Designated as No. 45-P, it offers the precision of a table-type machine with the range of a floor-type machine.

The standard spindle head with its compact design is employed. The feed and transmission unit with their chrome-alloy steel gears, and the ball bearing speed box with its twin-disk clutch sensitive control, are attached to a massive bed.

Three main units, bolted, dowelled and tongued together, make up the complete machine. The head, column and all the sub-units for the speed, feed, etc., constitute one unit. The end support and its bed, on which it can be moved back and forth and clamped in any desired position, is another unit, placed on the opposite side of the table. The planer bed and table placed at right angle to the spindle comprise the third unit.

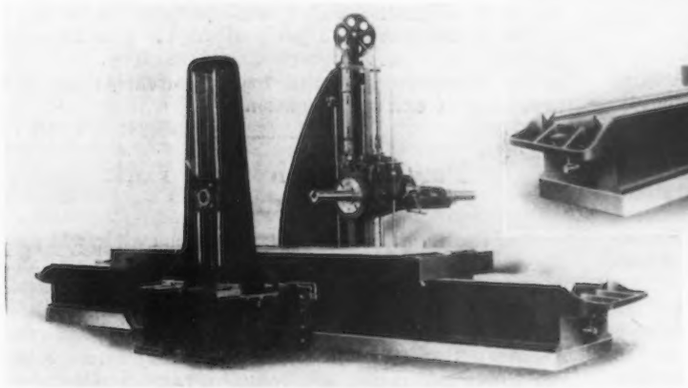
The end support, column and their beds are of the same general design as the standard No. 45, but much larger and considerably heavier. On the end support the guide block always moves up and down in unison with the head.

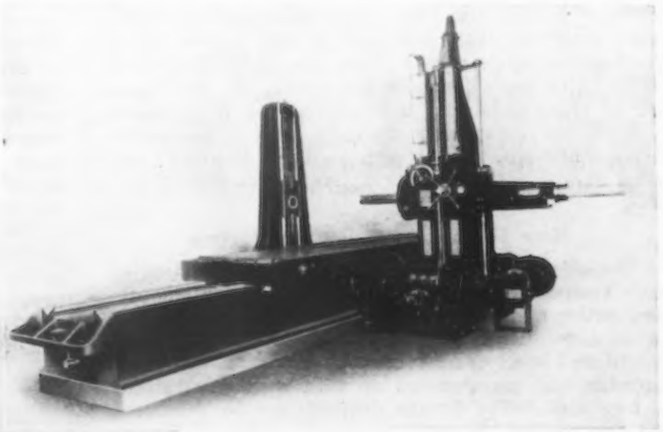
Table and bed are of extra heavy construction, provided with large V-ways and force-feed lubrication. It is arranged for hand and power feed and rapid traverse in either direction, also with hydraulic clamps for clamping the table in any desired position. All are controlled from the operating position. A particular advantage claimed for this type of machine is that, even for long cross travel of the table, the table does not overhang its bearings. It is always supported its full length.

Table and head movements can be arranged with the company's horizontal boring machine precision measuring device. The specifications of the machine shown include: Diameter of spindle, 5 in.; spindle travel, 66 in.; number of speeds, 12; range of speeds, 7 to 220 r.p.m.; maximum distance of spindle above table, 64 in.; maximum distance of spindle sleeve to end support, 84 in.; minimum distance of spindle sleeve to end support, 64 in.; distance edge of table to spindle sleeve, 10 in.; working surface of table, 52 x 168 in.; cross travel of table, 166 in.; length of V-ways, 332 in.; overall width of end support bed, 48 in.

A motor of 25 hp., at 1200 r.p.m., is recommended. The machine weighs about 72,000 lb.

The Precision of a Table-Type Machine With the Range of a Floor-Type Unit Is Claimed. The machine is made up of three main units





The Location of Operating Controls and Measuring Device May Be Noted from the Right-Hand View Above

Large Hollow-Forged Winding Engine Shaft

A complete winding engine shaft of special interest has just been delivered to Fullerton, Hodgart & Barclay, of Paisley, Scotland, by the forge department of William Beardmore & Co., Glasgow. The shaft is unusual because of its large dimensions and great weight.

It forms part of an electrically driven winding engine for the City Deep Mines, South Africa, and is designed to raise 9¼ tons of ore from a depth of 4500 ft. at the rate of 31 trips per hour, the winding speed being rather over 60 ft. per sec. The two drums mounted on the shaft are of the bi-cylindrical conical type, 17 ft. to 35 ft. in diameter, and weighing 350 tons. They are built up of cast steel segments and are directly coupled through the drum shaft to a motor at each end. The winding rope is 2¼ inches in diameter, and weighs 18 tons. The motors, which are 20 ft. in diameter and weigh 300 tons, will run at 327 r.p.m. at full load, and are capable of dealing with a peak load of 9240 hp.

The shaft is in three pieces, coupled together and consisting of the drum shaft in the middle, with a motor shaft at each end. The complete shaft has an overall length of 84 ft. 6 in., with an external diameter of 22 in. to 42 in., and an internal diameter of 8 in. to 18 in., its weight complete being 92 tons. As gross tons are referred to, it will be seen that the shaft's weight in net tons is well over 100.

The drum shaft, which had a finished weight of 58.5 tons, is 47 ft. 8 in. long, and has a diameter from 33 in. to 42 in. externally and 18 in. internally. For its manufacture an ingot weighing 120 tons was required. The ingot was forged into a bloom about 70 in. in diameter, which after annealing was sent to the machine shop, where the top and bottom were scraped and parted off and a hole 20 in. in diameter trepanned through its length.

The hollow bloom then went to the hydraulic forging press shop, where it was hollow forged on a mandrel. The forging was next annealed in a special type of furnace, and it then went to the machine shop to be rough turned. After a further annealing it went back to the machine shop to have the mechanical test pieces cut off and the machining completed.

It was possible to forge the two motor shafts from the ingot in the usual way, as they were not of the exceptional dimensions and weight of the drum shaft. When the three shafts were coupled together—with bolts 6½ in. in diameter—the complete shaft was put into one of the largest lathes in the shop, finally machined, and carefully tested to insure that all the journals were in true alinement.

BUSINESS PEAK IN 1931

Further Recession Until 1929 Will Conform With Business Cycle Theory

TRENDS in American business indicate that trade in 1928 will fall slightly below that of 1927, that 1929 will be a trifle less than 1928 and that there will be an upturn in the latter part of 1929 which will terminate in a new high point in 1931. This was the forecast presented by Franklyn Hobbs, director of research, Central Trust Co. of Illinois, before the business management conference at the Hotel Sherman, Chicago, Oct. 26.

Mr. Hobbs defended the value of the business cycle in forecasting, pointing out that a study of American business from 1790 to 1926 by the National Bureau of Economic Research showed the average length of the cycle swing for that period to have been exactly four years. Although there appears to be a striking analogy between an average business cycle swing of four years and a presidential term, this could readily be wiped out if a presidential term were fixed at any period other than the four years which has proved to be the business cycle period. But the accumulation of statistics on basic business operations, the intelligent use of these data and a knowledge of the position business now occupies in the cycle make it possible to forecast business with enough accuracy to avoid repetition of a deflation similar to that which occurred in 1921.

More Certainty Possible in Future

"Supplied as we are with almost every item of basic business information which is needed in the determination of the course of business," said Mr. Hobbs, "it is now almost inexcusable for an institution of size to find itself overloaded with raw materials, with manufactured merchandise or with warehouse stocks of any kind. The future demand can be measured and raw material producers, manufacturers and merchants must learn to govern their business operations with a due regard to the trend of events."

Admitting that certain events may change the percentage of rise or fall, but that no circumstance is likely to change the direction of the movement, the speaker stated that not even the World War changed the trend which was indicated by similar calculations made at the end of December, 1913. That calculation indicated depression late in 1914 extending into 1915 and improvement early in 1916, carrying through 1917 and into the fall of 1918, when a recession would begin. The recession began before the Armistice was signed and therefore it was not brought about by it. A forecast of business during that period may not have been accurate as to volume of trade, this fact being greatly influenced by the war, but the trend of business followed the business cycle. Less pronounced fluctuations in the business cycle may be looked for as a better understanding of management tends to iron out the high points on the curve and pull up the low points. But, in the opinion of Mr. Hobbs, the business cycle curve will never reach the point where it becomes a straight line.

Avoid Waste in Distribution

A new development in industry called profit-planning was suggested by C. E. Knoeppel, managing director of Waste Eliminators, Inc., Boston, who led a symposium and discussion on "Safeguarding Net Profit—Management's Principal Function." "Executives," he said, "must give attention to waste in distribution as well as in production. The present situation might be called business warfare with the margin between income and outgo as the objective." Reviewing the relative efforts of production and distribution, he called attention to the fact that prior to 1920 production effort exceeded that of distribution. In 1920 they were about equal, but as 1928 approaches it is found that distribution effort exceeds the effort that is being put into production by a wide margin.

Points Out Advantages of Business Cycle

That the business cycle, as expressed by a moderate swinging back and forth of the pendulum of industrial activity, is a healthy factor in maintaining prosperity was suggested by Henry S. Dennison, president Dennison Mfg. Co., Framingham, Mass., at a management meeting in New York on Oct. 25. The meeting, which was held at the Engineering Societies Building, 29 West Thirty-ninth Street, was sponsored by the metropolitan section of the American Society of Mechanical Engineers, the New York chapter of the Society of Industrial Engineers, the Taylor Society, the American Management Association and the New York chapter of the National Association of Cost Accountants, as a feature of National Management Week.

Mr. Dennison went on to say that an abrupt falling off in business like that which occurred in this country shortly after the close of the war was hardly representative of the business cycle. Slight fluctuations, however, he pointed out, tend to keep business operating at the highest point of efficiency and prevent the fatal stagnation which might develop in the long period of uninterrupted prosperity. He also stressed the important part scientific management should play in the maintenance of this healthy situation and the avoidance of extreme conditions.

Power Show in New York in December

The sixth annual National Exposition of Power and Mechanical Engineering is to be held at the Grand Central Palace in New York during the week commencing Dec. 5, paralleling the annual meetings of the American Society of Mechanical Engineers and the American Society of Refrigerating Engineers. Heat and power generation will occupy a large section with displays of boilers, stokers, furnaces, superheaters, valves and accessory devices.

In the planning and conduct of the exposition, the management is aided by an advisory committee including in its personnel I. E. Moultrop, Edison Electric Illuminating Co. of Boston; Willis H. Carrier, Carrier Engineering Co., New York; C. F. Hirshfeld, chief, research department, Detroit Edison Co.; O. P. Hood, chief mechanical engineer Bureau of Mines; John A. Hunter, Pittsburgh; E. B. Katte, chief engineer electric traction, New York Central Lines; R. T. Kent, Bridgeport Brass Co.; John H. Lawrence, Thomas E. Murray, Inc., New York; and Charles M. Schwab, president American Society of Mechanical Engineers. The managers of the exposition are Fred W. Payne and Charles F. Roth, Grand Central Palace, New York.

Rates on Zinc Sheets to New York Declared Reasonable

WASHINGTON, Nov. 1.—Rates of 58.5c. per 100 lb. to New York and 54.5c. to Philadelphia from Greencastle, Ind., on zinc sheets, plates and strips are not unreasonable or otherwise unlawful, according to a proposed report made to the Interstate Commerce Commission last week by Examiner Thurston B. Johnston. The complaint against the rates was made by the American Zinc Products Co., Greencastle.

Schedule of the next installments of the ***Business Analysis and Forecast,*** *by Dr. Lewis H. Haney, Director New York University Bureau of Business Research, follows:* ***Nov. 17****—Activity in Steel Consuming Industries;* ***Nov. 24****—Position of Iron and Steel Producers;* ***Dec. 1****—General Business Outlook.*

Says Overproduction Is Greatest Stimulus to Efficiency

WASHINGTON, Nov. 1.—In a public statement regarding "Overproduction in its Relation to Our Anti-trust, Immigration and Protective Tariff Laws," Robert S. Brookings, president Institute of Economics, industrialist and former chairman of the price-fixing committee of the War Industries Board, says that the losses from overproduction are enormous, but are the prices paid for the maintenance of freedom.

"For obviously freedom cannot mean either that capital shall receive a return or that labor shall be paid a living and saving wage for rendering services which are already rendered in abundance," he said.

"Moreover, the pressure of overproduction is the greatest stimulus to efficiency. In the production of every commodity there is to be found every degree of efficiency, from the least to the greatest. When the supply is less than the demand, the least efficient producer is kept alive by a high price, and the most efficient profits so much as to put pressure upon increased production. This procedure naturally ends in overproduction and a price so low that the least efficient producer ceases to exist and the most efficient devotes his entire energies to increased efficiency in order to recoup his lessened profits. Increase in population, and higher standards of living in the course of time bring about a demand in excess of production once more, and the same cycle is repeated.

"The wide fluctuations which formerly came from this process have been greatly lessened in this country by the policies of big business, an outstanding example of which is the policy pursued by the United States Steel Corporation. Big business is interested first in stability, and avoids taking advantage of a short supply to secure an excess profit—a procedure which, they recognize, would simply bring increased competition into existence, and, in the last analysis, cost more than it would earn.

"It would be easy to prevent overproduction in many lines of business, if public policy permitted producers to combine to limit production. However, it is at least as important to protect consumers from extortion as it is to protect producers from the results of overproduction. Our Government has, therefore, by both the State and National anti-trust laws, insisted that no agreements between producers shall be made which so limit supply as to make possible the extortion of an unfair value from the consumer. It is difficult to draw the line between legitimate activities designed to prevent overproduction and those agreements which destroy equality of opportunity and aim at an unfair enhancement of price."

Mr. Brookings pointed out two modifications of anti-trust policy that permit wholesome stabilization. The first, he said, was the Webb-Pomerene act allowing agricultural and industrial interests to combine for the sale of surplus products abroad at any price they please. The second was a relaxation in the rigidity of the anti-trust laws related to exchange of information, reference being made to decisions of the United States Supreme Court in the maple flooring and cement cases. Overproduction that is due to ignorance or uncoordinated planning, is to be avoided, he asserted, and supply should be adjusted to demand. Production, however, declared Mr. Brookings, is not to be curtailed by agreement with a view to exacting an unfair price.

"Further than this we can hardly go in protecting either agriculture or industry from the risk of overproduction," it was declared. "Both the Webb-Pomerene act and the program of extensive exchange of information are available for the benefit of agriculture, as well as industry. Price fixing in the interest of the producer is a subsidy to overproduction, which simply increases the evil and defeats the whole purpose of the anti-trust laws."

Apparent consumption of babbitt metal in September is reported by the Department of Commerce at 4,792,367 lb. Except for July, this is the smallest monthly total of the year and is smaller than in any month of the two preceding years. The August total was 5,496,659 lb., while in September, 1926, the consumption was 5,749,991 lb.

Sales of Machinists' Tools Made in New England

WASHINGTON, Nov. 1.—Annual sales of machinists' tools made in New England range in individual companies from hundreds of thousands to several million dollars among firms recently surveyed by the Department of Commerce in cooperation with the New England Council. Since 1921 a decidedly upward trend has been shown in total sales, 43 per cent of which are made in New England markets, the survey disclosed.

The report states that of the chief raw materials used by these companies steel is bought mostly outside New England, but iron, mostly castings, is purchased within New England.

Harrington Machine Tool Line Taken Over by Consolidated Corporation

The machine tool business of the Harrington Co., Philadelphia, has been taken over by the Consolidated Machine Tool Corporation of America, which will move the tool department of the Harrington company to its Rochester plant.

Machine tools in the Harrington Co. line included hydraulic multiple-spindle drilling machines of vertical and horizontal types. The company will concentrate its facilities on the manufacture of chain blocks, electric hoists, trolleys and other material handling equipment, which has been known to the trade for several years.

Will Control Patents on Chromium Plating

United Chromium, Inc., 30 East Forty-second Street, New York, has been organized as a holding company for the patents formerly owned by the Chromium Corporation of America, 120 Broadway, New York, and the General Chromium Corporation, Detroit. The former company owned the patents of the Chemical Treatment Co., Inc., and the Chromium Products Corporation, while the latter company held patents formerly owned by the Electro Metallurgical Co., Inc., and the General Chromium Corporation.

The new company will grant licenses to manufacturers and others to operate its process of chromium plating under its patents and will authorize two exclusive licensing agents, the Chromium Corporation of America and the General Chromium Corporation. These companies have been operating plants at Waterbury, Conn.; Detroit and Chicago for more than a year and have licensed approximately 60 companies to operate under their patents.

The following officers have been elected: Frederick S. Wheeler, chairman; F. H. Hirschland, president; Andrew E. Baldwin, vice-president; John T. Pratt, Jr., secretary; F. M. Becket, treasurer, and W. H. Billings, assistant treasurer.

Program for Refractories Meeting

The tentative program of the joint meeting of the American Refractories Institute and the American Institute of Chemical Engineers to be held Dec. 6 and 7 at the Chase Hotel, St. Louis, includes the following:

Motion picture, "The Story of Fire Clay Refractories."

"An Outline of the Refractories Industry," by J. D. Ramsay, president Elk Fire Brick Co., St. Marys, Pa.

"Problems in the Development and Technology of Refractories," by Stuart M. Phelps, director of research and tests, Refractories Fellowship, Mellon Institute, Pittsburgh.

"Some Special Refractories Which Are Still in the Experimental Stage," by G. A. Bole, research professor of ceramic engineering, Ohio State University.

"Developments in Burned Dolomite as a Stable Basic Refractory," by M. E. Holmes and G. A. Bole. Mr. Holmes is professor of ceramic engineering, University of Missouri.

W. J. Rainey, Inc., gave a trip to the recent Chicago meeting of the National Safety Council to the safety director, the superintendent, foreman and assistant foreman of one of its coal mines which had a decidedly good safety record.

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What Five Months' Issues Have Given

FABRICATING industries have been served with 108 articles in these columns in five months, with a total of 310 columns. These cover the foundry, welding departments, machine shops, heat-treating work, plating work, forging and pressing, plate and boiler shops, general assembling and the like. In the direct interest of the producing industries—pig iron and steel making, steel rolling and problems of quality, including alloys—there have been 75 articles, of 249 columns total length. Under the management and selling classification have appeared 68 articles, or 248 columns, and general articles, including some 20 convention reports, have taken 195 columns in 41 articles.

All of these 292 articles of major importance are in addition to all the numerous news developments in short articles and items and to the weekly detailed iron and steel market reports and to the weekly grist of business leads comprised in the machinery markets.

This Issue in Brief

Group bonus payment for production efficiency is superior in many cases to individual bonus, Westinghouse finds. The latter stimulates individual performance at the expense of cooperation. The former stimulates an entire group of workers, and encourages the more experienced hands to school those less proficient.—Page 1224.

When selecting a new plant site, consider these ten points: Climate, natural resources, power sources, transportation of raw materials, distribution of finished products, labor supply, tax legislation, cost of moving, type of plant, and local advantages.—Page 1226.

Millions squandered in inefficient selling efforts may be saved when distribution data are available. Ignorance of economic market boundaries and craze for full order books, are wasting a great part of the savings made by improved manufacturing methods. The Government will soon release the first of a series of regional commercial surveys, designed to take some of the guess work out of marketing.—Page 1277.

What will be the fate of the old-style sheet mills in competition with the new continuous mills? The existing order of things will not be drastically disturbed, says steel man. The change will be gradual, the old mills dropping out as they become economically unprofitable. —Page 1234.

Core-makers' time and energy are conserved by inclined conveyor. Cores are loaded in moving racks with several shelves. The first core-makers load the top shelves, and as the conveyor moves down the line between the core benches it rises, so that the other core-makers may place their cores on the bottom shelves without bending.—Page 1221.

New structural steel fabricating shop has three lines of industrial track running straight through the plant from warehouse to loading yard. Cross transfer is provided by floor operated electric cranes.—Page 1228.

"Destructive competition" in steel industry is deplored by Schwab. Average earnings have been cut to such a point that returns on steel securities are lower than on gilt-edged bonds, new Institute head declares.—Page 1230.

Production control and wage incentives are based on standard unit of man-power. The measuring unit used by a sewing machine maker is the energy developed by a man working under normal conditions at a normal rate of effort for one minute of time.—Page 1224.

Business improvement will come in the latter part of 1929, says bank official. The cycle will terminate in a new high point in 1931, he declares.—Page 1244.

"'Ware the economic moonshiner," warns Industrial Conference Board's chief economist. Throw off the hypnotic spell of the statistical sleight-of-hand artist, and put your confidence in your native business instinct. "Mobile-mindedness" and adaptability of the American business man are major factors in national prosperity. — Page 1231.

Is over-production essential to manufacturing efficiency? While losses from over-production are enormous, they are the price paid for the maintenance of freedom, says Institute of Economics head. When supply passes demand, prices are forced down; producers concentrate their energies on cost reduction to recoup lessened profits. In this way high-cost producers are pressed to the wall.—Page 1245.

If you would buy to the best advantage, study prices and price trends before ordering, says General Motors executive. In addition, vendors' records, showing capacity and past performance on orders, should be examined.—Page 1226.

Pay worker standard rates if he equals or beats the time quota for the job. But if he exceeds the time allowance Westinghouse pays the day rate, which is lower.—Page 1224.

Should foremen get a bonus for increased production? No, say majority at management meeting, for under ordinary conditions the flat rate is more satisfactory.—Page 1225.

Labor costs are reduced to a minimum in new Buick continuous foundry. Lavish use of labor-saving equipment eliminates heavy handling. Machinery takes the place of man-power wherever possible. With a capacity of 750 tons per 8 hr. day, this is one of the largest foundries in the country. — Page 1217.

Steel-frame dwellings will cost no more than wood, says Robert Tappan. Though material cost is now slightly higher, the labor cost should be lower, using interchangeable steel members.—Page 1239.

Competition of one industry with another is not peculiar to the steel fabricating industry, banker points out. This form of competition is rather general right now, with American business in general "volume crazy." —Page 1239.

Exports and imports are tapering off. Machinery exports in September were 16 per cent under August. Iron and steel exports were 5 per cent lower. Imports of iron and steel for the first nine months were 34 per cent below same period of last year.—Page 1281-1283.

ESTABLISHED 1855

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Gary Cooperation Goes On

WITH 1600 men of the iron and steel industry in his audience, Charles M. Schwab gave his inaugural as president of the American Iron and Steel Institute under auspices that scarcely could have given better augury of the success of his administration. His long career as a leader in the industry, his faith in its destiny shown in good times and bad, his great contribution to its mechanical and metallurgical triumphs, his genius for friendliness, and the charm of his personality were all factors in the unanimous indorsement the membership gave to the choice of the directors.

Added to this, the hearty pledge of support given by Mr. Farrell as president of the Steel Corporation and on the corporation's behalf made the occasion of the highest significance. All that was said by officers and directors of the institute at the opening of Friday's session and the earnestness with which it was said convinced those who heard that the same spirit of cooperation which Judge Gary had fostered in the 19 years of his leadership would continue. Mr. Farrell went even further, expressing the conviction that the industry "is about to enter upon an era of more intensive cooperation, with a resultant stabilization." No little importance was attached also to Mr. Farrell's statement that "without infringing or contravening any law there ought to be an atmospheric disposition on the part of our people to be fair with one another. . . . We have got to dispose of some of the methods we have been employing in doing business and show a better and broader disposition. I for one believe that our business can be done on a reasonable basis."

It need not be doubted that there has been serious thinking by the heads of the large steel companies over the course of steel prices and earnings in the past few months. There is a great desire to remedy the situation, but it is recognized that the difficulties are neither small nor few. Everywhere cost reduction has been the slogan. Everywhere volume has been strained after as a foremost means of cost reduction. And volume too often has been secured by price concessions. That is the vicious circle from which the steel industry has been suffering. Judge Gary many times laid the blame for price cutting and low earnings upon the steel manufacturer who, knowing that only a 60 per cent demand existed, insisted on an 80 per cent operation of his plants.

Mr. Schwab was not a whit behind Judge Gary in the earnestness and urgency of his plea for better selling methods. On this subject he said in part:

> The next great move of the steel industry must be the proper and economic distribution and selling of its product. I do not mean to say that we have anything in mind that is not in strict conformity with the regulations and laws of the country; that always must be fundamental in this institution. But I do say that destructive competition in an industry as large as ours, for the sole purpose of gaining a position in the industry, is ill advised and costly. . . . As Judge Gary so often expressed it, live and let live. These works are here and we have our customers and we have our trade and we have our position, and therefore we must try to respect our relative positions and see if we cannot do something toward the betterment of our returns, profits and business. That is the real purpose of the cooperative spirit that is necessary for the betterment of our business and the industry.

"New occasions teach new duties." What was said at the Iron and Steel Institute meeting last week and the evident sincerity with which it was said signify that the work to which Judge Gary gave himself with such singleness of purpose has fallen to men no less devoted to the common interest. It may even happen, as it has happened before, that the aims of the founder will be further advanced by those who come after him, under the cohesive power of new responsibilities and the challenge of new and perhaps more difficult situations. With no attempt to convert the utterances of the new president into definite prophecy of the immediate future of the steel trade, the members of the institute carried away from last week's meeting a distinctly hopeful view of its work under the new administration.

IN steel bars at least Germany is not the chief offender in exports to American consumers. To Aug. 1 this year, out of about 56,500 gross tons re-

ceived, Belgium leads with over 30,000 tons; France is second with 9200 tons. Germany ranks third and is credited with about 9000 tons. Swedish and British makers follow in the order named. The largest tonnage goes to the Pacific Coast, 34 per cent of the total imports being received there, while 36 per cent is credited to New York and Philadelphia. It is something of a surprise that Germany has realized so little in comparison with the extent of the anti-dumping agitation against her product.

New Markets for Old

BELIEVE it or not, it is a fact that cast iron was once used extensively for beams and ornamental fronts on large hotel and business structures. That was before the invention of the steel skeleton skyscraper and the passenger elevator. Should an organization of foundrymen spend much time now in trying to recover that lost market?

Such an organization might also discover that cast iron was used for railroad rails about a hundred years ago, and that today many miles of railroad in India, carrying modern engines and rolling stock, is laid on cast iron "pot" sleepers. Would it be wise to attempt to tell the maintenance of way department that it makes a mistake in specifying open-hearth steel rails, or would it be a better plan to study the conditions existing in India, which warrant the survival of cast iron in the permanent way, and then look for other places where similar economic conditions prevail?

Obviously, "campaigns to recover lost markets" are not always worthy of support. Sometimes markets are lost for such good and sufficient reasons as that the clock would have to be turned back in order to recover them. Witness the zinc bath tub. Fifty years ago it was a luxury. But the general scale of living has so changed that the American public demands, and pays for, a more expensive but a more cleanly looking enameled tub. Even here the ultimate may not have been reached. It is possible that sheet steel, pressed to shape, will take an enameled finish good enough to make sanitary ware, and at a price materially cheaper than is possible with the cast iron foundation.

In such an instance, a campaign to retain the sanitary ware market should be the first object of an association of foundrymen. If they have and can disseminate correct information about cast iron and approach the right people, they can hold their own against all innovations and substitutions so long as the balance of economic advantage is on their side. In order to replace business that may be lost to better situated materials and processes, a campaign in fields new to cast iron will prove far more prolific than an effort to rehabilitate cast iron store fronts and railroad rails.

The reference above to a foundrymen's association is only by way of illustration. Sheet metal manufacturers, copper and brass interests, steel construction institutes, welding associations—to mention only a few—are in the same boat. They profit most by knowing most about the potentialities of their own process or material, and then blazing a way for business in those lines for which they are best fitted, whether they now occupy these particular fields or have to oust another process less fitted to survive the competition.

Getting Utmost Results

DURING his most interesting demonstration of the "by-products of radio" to the American Iron and Steel Institute last Friday, S. M. Kintner, manager of the Westinghouse Research Department, operated a new sound-producing device. Ordinary Victor records were played. By reproducing sounds of short wave lengths in one compartment of the speaker and by duplicate electrical devices setting up the longer wave lengths in larger compartments, marvelous fidelity to the original voice or musical instrument was achieved. Mr. Kintner emphasized the fact that all the tones and overtones heard by most of the audience for the first time are recorded on the ordinary record, and always have been there; what has been lacking is the ability to get them out again.

Many branches of business are suffering from the same inability to get the inherent capabilities out of the tools, the organization, and the manufactured product. Often executives are driven to purchase specialized tools or to pursue undesirable trade without spending enough thought on whether the present equipment or trading field is yielding its maximum possibilities.

Of course, what the economists call the principle of diminishing returns must be kept in mind. There always comes a time when an old machine costs more to maintain than it earns, when added business costs more to get than it is worth. Then it is necessary to modernize plant and expand into other activities. But it is safe to say that few men have yet been patient enough to exhaust the existing potentialities.

The phonograph record is a striking illustration of this fact. Another: Bolts, screws and nuts, ordinary heavy hardware, have been greatly improved, not by going to alloy steels, but by refining the old carbon steels and subjecting them to the proper combination of cold work and heat treatment. Again: Henry Ford has found it possible to make his celebrated automobiles with a steadily diminishing variety of alloy steels—his staff is continually looking for the most adaptable ones and then drawing out of each its various capabilities.

Many a lathe or milling machine can be adapted for changed production by a suitable and minor change in jig, fixture, or attachment, costing much less than a new and specialized machine and earning proportionately more on the outlay. Railroads have made most gratifying improvements in engine performances by installing superheaters and stokers on the older locomotives.

Instances might be multiplied, but it is unnecessary. We are trying to emphasize that a study of existing plant and of the commercial field will be well worth the executive's time and trouble. The attitude of "What I have is good enough; I'll stay as I am" is fatal to business, for a concern that is standing still is being outdistanced by competitors moving forward. Such an attitude will never make an effort to draw the most out of the organization as it is. A business which does make the effort is continually modernizing itself—it is moving for-

ward, frequently on surer ground than another which brushes all the old aside and replaces it with brightly varnished specialties.

Few organizations have the means to pay for these sudden revolutions. But all solvent concerns can progressively modernize.

Keeping Up By-Product Coke Output

IN various connections the trade is feeling more and more the working of the principle that it is highly desirable to maintain the operation of by-product coke ovens. When the regular requirements decrease efforts are made to find an outlet. Steel companies sell pig iron in the open market, while detached plants, lacking their usual market in foundry coke, prepare more of their coke for domestic use. The most impressive showing in this connection is the low stage reached by production of the furnace ovens of the Connellsville region.

Ignoring holiday weeks, when production is naturally light, and pre-holiday weeks, when it may be swelled temporarily, the Connellsville *Courier* reports have shown the following high and low weeks in Connellsville coke production (in net tons) by the furnace ovens:

	Low	High
1923	110,800	190,200
1924	16,200	160,000
1925	26,500	114,100
1926	54,200	124,200
1927	10,500	80,400

Of course there has been a progressive decline in output which must be allowed for, but it is notable that the almost complete stoppage at times has occurred only since 1923, there having been relatively steady production in that year. The low recorded above for this year is simply the production of the week ended Oct. 22, when there were merely 422 Frick and Hostetter ovens in blast and 400 Alicia ovens, according to the *Courier's* detailed report. The coke figures are, of course, not indicative of industrial activity in the Connellsville region, for there are heavy shipments of coal to by-product ovens.

The merchant coke production of the Connellsville region has also reached a low rate, due to light requirements by the class of furnaces using purchased coke, and to the fact that some of their coke is purchased from by-product ovens. The average merchant oven production lately has been about 38,000 tons a week. The combined production is at the rate of 2,500,000 tons a year, whereas in 1912 and 1913 a trifle over 20,000,000 tons was produced, making the region's best years except for 1916.

Again the Steel House

A LEADING fabricator of structural steel has established a subsidiary to fabricate and erect steel-framed dwelling houses. As stated in THE IRON AGE last week this is the first definite undertaking to place steel-framed house construction on a commercial basis. How rapidly this comparatively new field for structural steel will develop is a matter of conjecture, but it is evident that it is getting more serious consideration than ever and that some of the early impediments are being cleared away.

In 1926, according to an estimate of the F. W. Dodge Corporation, residential building in the United States represented an investment of $2,890,000,000. In the 37 States east of the Rocky Mountains for which actual figures are given in the Dodge reports one-family dwellings alone accounted for $1,200,000,000. As these States represent 91 per cent of the country's building, one-family houses in the entire country were responsible for a total investment of about $1,320,000,000.

A recent estimate by *Building Age*, based upon Government reports in 257 cities, shows that 20 per cent of the nation's population lives in two-family houses. Assuming that this percentage holds true in the Dodge figures, the investment in this type of building in 1926 was about $580,000,000. Thus the expenditure last year for residential buildings of the type for which the steel frame would be practical was approximately $1,900,000,000.

On the assumption that about 10 per cent of the cost of dwelling houses is represented by the frame, it has been estimated that an annual market of $190,000,000 might be developed if steel were to displace wood entirely for frame construction. At present the average cost of manufacturing and fabricating the steel required for the steel-framed dwelling is $135 a ton. Thus, if steel had been used entirely for the framework, small house construction in 1926 would have taken approximately 1,400,000 tons of light structural steel, or about 35 per cent of last year's production of structural shapes.

That capital outlay for new steel capacity or even for the attainment of new economies in production will be on a more restricted scale in the immediate future than at any time since the war is a reasonable deduction from the market trends and the steel company balance sheets of the past year. Naturally new outlets for the industry have become a prime concern of management. It is not surprising, therefore, that the steel house is no longer classed among the theoretically interesting but practically negligible lines of possible consumption.

CORRESPONDENCE

Doubts Tube Mill Expansion in Germany

To the Editor: With reference to the article "New German Tube Mill to Produce 90,000 Tons a Year," which appeared in the issue of your paper of Sept. 29, page 923, we beg to point out to you that it will be quite impossible to erect a tube mill for a yearly output of 90,000 tons with the available capital.

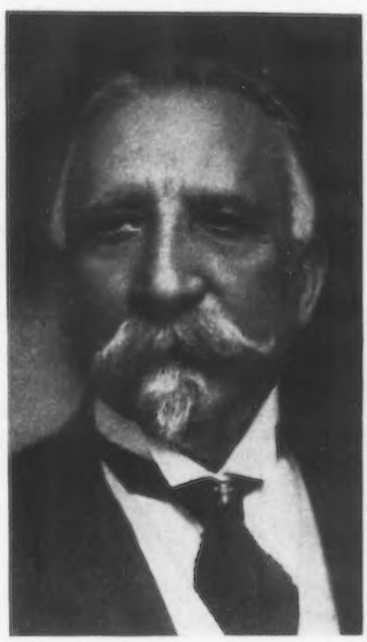
In our opinion the whole thing seems to be a bluff in order to wrest some arrangement from the Tube Cartel. There is some talk here of erecting first a gas tube welding plant for small tubes up to 2 in. When the United Steel Works Co. was founded, some four or five such plants were shut down from want of orders and as yet have not gone in commission again. The situation with regard to the weldless tube plants is similar. It is therefore out of the question that this new corporation will merge with the United Steel Works.

You are at liberty to publish the foregoing in your paper for those who are interested in tube mill machinery, but we would, nevertheless, kindly ask you not to disclose our name, considering that your article was without the name of its author. D. G.

Cologne, Germany.

David Williams, Whose Name for More Than 40 Years Was Identified with "The Iron Age"

DAVID WILLIAMS, publisher and sole owner of THE IRON AGE from 1868 to 1909, died at his home at Rogers Rock, Lake George, N. Y., on Saturday, Oct. 29, aged 85 years. He was born in Waterford, Ireland, Dec. 23, 1841, and came with his parents to the United States in 1850. His father, John Williams, received his early business training as a hardware salesman, and the elder Williams's first engagement in the United States was with the saw manufacturing firm of Wheeler, Madden & Bakewell, Middletown, N. Y. David Williams graduated from the Middletown Academy in 1857. Two years previously the father began the publication at Middletown of the trade journal known as the *Hardware Man's Newspaper*. David Williams, who had learned the printer's trade, had to do with the mechanical part of the business.



DAVID WILLIAMS

The journal first appeared under its present name, THE IRON AGE, in April, 1859. The reasons for the change of name were given at length in the leading editorial of that issue. John Williams was a patriotic Irishman and one reason for his emigration to the United States was that his activities as a nationalist had to some extent embarrassed his career. On coming to this country he was naturally enthusiastic in the promotion of American industry, believing that the American market was destined to free itself more and more from dependence upon the manufacturers of Great Britain. In the editorial referred to, Mr. Williams announced his purpose to "defend faithfully and constantly the claims of domestic industry" and promised that THE IRON AGE would "especially labor to demonstrate the necessity and advantage of a settled protective policy."

David Williams acquired THE IRON AGE from his father in 1868. Four years earlier, the publishing office was moved from Middletown to New York, locating at No. 80 Beekman Street, in an old dwelling house remodeled for business purposes. A small space contained the counting room, editorial offices and composing room. The paper was printed from its own type in one of the large nearby printing offices. David Williams studied the problems of his business with tireless industry and decided every question as it arose with reference to the effect of his decision for ten years ahead. In 1877 Mr. Williams started the *Metallurgical Review*, the first engineering magazine published in this country. A year later it was merged with THE IRON AGE. In 1873 Mr. Williams established the *Metal Worker* and six years later *Carpentry and Building*. These publications were later merged with others in their field and as such are now published by interests which acquired them from the David Williams Co.

In 1909, after 41 years of ownership and nearly a half century of connection with THE IRON AGE, Mr. Williams disposed of his publishing business to a group of men in New York trade journalism, headed by Charles T. Root. In his valedictory, referring to the launching of the paper 54 years before and to what it had accomplished meanwhile, he wrote:

"America was then a half settled agricultural country with rudimentary industries and depending on Europe for most of her manufactured goods. That she might throw off that dependence and become herself the greatest industrial country in the world was the hope and ambition of my father, John Williams, the founder of THE IRON AGE. That result has been achieved, and the journal he established has not been without influence in its accomplishment. It has been my life work and I have been proud of its success and standing. From a small beginning it has become the greatest trade journal in the world, with a reputation for accuracy and fairness enjoyed by very few."

Soon after THE IRON AGE had been acquired by Mr. Root and his associates its hardware department, which had long been an important part of the paper (ably edited by R. R. Williams, brother of David Williams), parted company with the iron and steel and machinery departments and became a distinct publication, known as *Iron Age-Hardware*. At the same time another trade journal, *Hardware*, was merged with *Iron Age-Hardware*. Later the name was changed to *Hardware Age* and this publication has been an increasingly important factor in the great hardware field.

In THE IRON AGE of Jan. 4, 1906, an issue which celebrated the fiftieth anniversary of the founding of the paper, James C. Bayles, who had been editor of THE IRON AGE in the period 1869 to 1889, wrote thus of David Williams:

"The man whose name is probably best known in the iron, steel, hardware and metal trades of the United States, David Williams, is known other than by name to comparatively few, and intimately to still fewer. With every natural and acquired qualification for social intercourse on the highest plane, he has preferred the retirement of his own domestic circle, and even in his business relations has found it agreeable to be represented rather than to represent himself.

"In character and temperament David Williams is peculiarly lovable. In business he is broad-minded, just and liberal. His judgment of men, while accurate is always tempered by kindly consideration. He is patient toward all men, but the only claim upon his confidence and respect is founded in honesty of purpose, unvarying truthfulness, loyalty to principle and fidelity to duty. He has enjoyed life simply, but has never lost sight of the fact that a successful business policy must be planned for as far ahead as a clear foresight can penetrate.

"I never heard David Williams speak rudely, discourteously, impatiently or without a delicate consideration for the feelings of the person addressed. It gives me pleasure to say that I have never known David Williams to take an unfair advantage of a business opportunity, large or small, nor to treat anyone

other than he would expect and desire himself to be treated in like circumstances."

Mr. Williams traveled extensively and had a large interest in art. His society memberships included the American Institute of Mining and Metallurgical Engineers, Municipal Art Society, and Scenic and Historic Preservation Society. His clubs were the Century, Engineers and National Arts. He was a charter member of the Engineers Club and for a number of years a vice-president. In his active career as publisher he was president of the American Trade Press Association and of the Federation of Trade Press Associations in the United States. He leaves three children, Mrs. Homer Foot and David L. and Richard F. Williams.

October Iron Output New Low for Year

Daily Rate Declined 2688 Tons or 2.9 Per Cent from September—Net Loss of 7 Furnaces

ANOTHER sharp decrease in pig iron production was registered in October. Data collected by wire on Nov. 1 show the daily rate to have been 89,810 tons, a decline of 2688 tons, or 2.9 per cent, from the 92,498 tons per day in September. In some cases estimates for the last day's output were made by a few companies. The October decrease is the seventh month in succession and the daily rate is the smallest since August, 1925, when it was 87,241 tons per day. For the last three years October has shown an increase over September; this year operations ran nearly parallel to October 1923; the decline then was 2598 tons per day, or 2.5 per cent.

October's total pig iron output was 2,784,112 gross tons, or 89,810 tons per day for the 31 days, against 2,774,949 tons, or 92,498 tons per day in September, a 30-day month. The decline of 2688 tons in the daily rate last month compares with 2575 tons in September, with 126 tons in August, with 7789 tons in July and with 6397 tons per day in June. A year ago the October daily rate was 107,553 tons.

Net Loss of 7 Furnaces

There were 10 furnaces shut down and 3 blown in—a net loss of 7 for the month. This compares with a net loss of 8 in September, 3 in August, 8 in July,

Daily Rate of Pig Iron Production by Months—Gross Tons

	Steel Works	Merchants*	Total
October, 1926	83,188	24,365	107,553
November	82,820	25,070	107,890
December	74,909	24,803	99,712
January, 1927	75,609	24,514	100,123
February	80,595	24,429	105,024
March	86,304	26,062	112,366
April	87,930	26,144	114,074
May	84,486	24,899	109,385
June	78,110	24,878	102,988
July	69,778	25,421	95,199
August	71,413	23,660	95,073
September	69,673	22,825	92,498

*Includes pig iron made for the market by steel companies.

Pig Iron Production by Districts, Gross Tons

	Oct. (31 days)	Sept. (30 days)	Aug. (31 days)	July (31 days)
New York and Mass.	232,422	222,485	231,625	226,700
Lehigh Valley	81,829	86,398	88,451	84,429
Schuylkill Valley	64,260	52,256	37,284	52,510
Lower Susq. and Lebanon Valleys	31,828	30,349	31,244	27,173
Pittsburgh district	540,525	555,384	580,459	534,610
Shenango Valley	77,106	83,919	98,687	105,136
Western Penna.	93,010	91,774	96,833	97,399
Maryland, Virginia and Kentucky	88,991	80,973	95,528	96,070
Wheeling district	110,222	114,357	130,065	136,265
Mahoning Valley	245,625	248,834	265,726	263,456
Central and Northern Ohio	324,793	311,141	327,703	340,306
Southern Ohio	32,954	25,636	27,046	32,479
Illinois and Indiana	506,438	533,686	572,623	587,755
Mich., Minn., Mo., Wis., Colo. and Utah	121,203	122,309	140,069	146,938
Alabama	224,533	207,363	212,337	208,739
Tennessee	8,373	8,085	11,596	11,195
Total	2,784,112	2,774,949	2,947,276	2,951,160

Daily Average Production of Coke Pig Iron in the United States by Months Since Jan. 1, 1923—Gross Tons

	1923	1924	1925	1926	1927
Jan.	104,181	97,384	108,720	106,974	100,123
Feb.	106,935	106,026	114,791	104,408	105,024
Mar.	113,673	111,809	114,975	111,032	112,366
Apr.	118,324	107,781	108,632	115,004	114,074
May	124,764	84,358	94,542	112,304	109,385
June	122,548	67,541	89,115	107,844	102,988
½ year	115,147	95,794	105,039	109,660	107,351
July	118,656	57,577	85,936	103,978	95,199
Aug.	111,274	60,875	87,241	103,241	95,073
Sept.	104,184	68,442	90,873	104,543	92,498
Oct.	101,586	79,907	97,528	107,553	.....
Nov.	96,476	83,656	100,767	107,890	.....
Dec.	94,225	95,539	104,853	99,712	.....
Year	109,713	85,075	99,735	107,043	.....

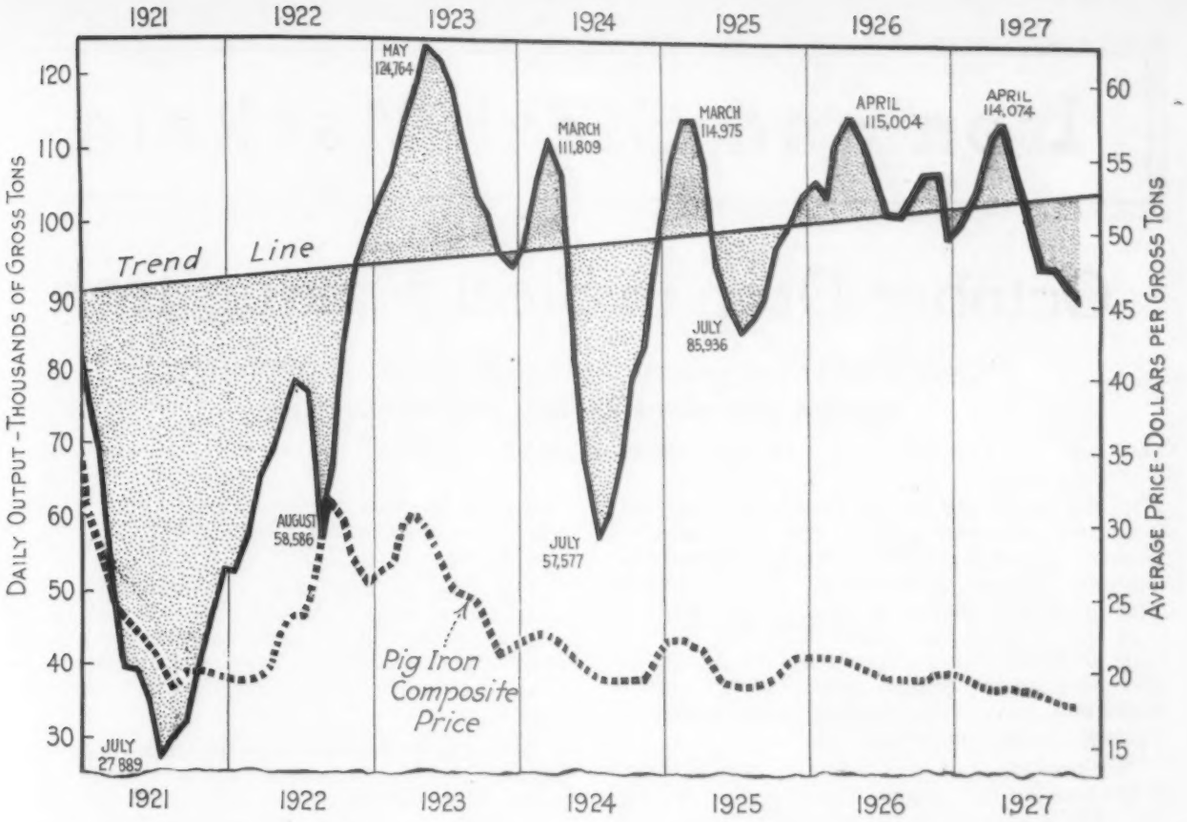
Coke Furnaces in Blast

Furnaces	Total Stacks	Nov. 1 In Blast	Nov. 1 Capacity per Day	Oct. 1 In Blast	Oct. 1 Capacity per Day
New York:					
Buffalo	21	14	6,375	14	6,490
Other N. Y. and Mass.	6	2	785	3	1,155
New Jersey	3	0	....	0	....
Pennsylvania:					
Lehigh Valley	11	5	2,440	5	2,090
Spiegeleisen	2	1	195	1	175
Schuylkill Valley	12	5	2,070	5	1,940
Susquehanna Valley	4	2	960	2	945
Ferromanganese	1	1	65	1	65
Lebanon Valley	0	0	....	0	....
Ferromanganese	2	0	....	0	....
Pittsburgh District	51	26	16,480	28	17,770
Ferro. and Spiegel	4	2	345	2	340
Shenango Valley	13	5	2,480	5	2,540
Western Pennsylvania	18	6	2,870	6	2,840
Ferromanganese	2	1	130	1	215
Maryland	5	5	2,270	5	1,890
Ferromanganese	1	0	....	0	....
Wheeling District	13	6	3,550	6	3,670
Ohio:					
Mahoning Valley	26	12	7,570	13	8,125
Central and Northern	23	18	10,475	18	10,370
Southern	13	4	1,060	3	855
Illinois and Indiana	44	26	15,595	28	17,790
Mich., Wis. and Minn.	12	6	2,640	6	2,300
Colo., Mo. and Utah	7	3	1,240	4	1,525
The South:					
Virginia	14	1	235	1	240
Ferromanganese	1	0	....	0	....
Kentucky	5	1	360	1	350
Alabama	34	18	7,200	18	6,800
Ferromanganese	1	0	....	1	60
Tennessee	12	2	210	2	260
Total	361	172	87,600	179	90,800

Production of Coke Pig Iron in United States by Months, Beginning Jan. 1, 1925—Gross Tons

	1925	1926	1927
Jan.	3,370,336	3,316,201	3,103,820
Feb.	3,214,143	2,923,415	2,940,679
Mar.	3,564,247	3,441,986	3,483,362
Apr.	3,258,958	3,450,122	3,422,226
May	2,930,807	3,481,428	3,390,940
June	2,673,457	3,235,309	3,089,651
½ year	19,011,948	19,848,461	19,430,678
July	2,664,024	3,223,338	2,951,160
Aug.	2,704,476	3,200,479	2,947,276
Sept.	2,726,198	3,136,293	2,774,949
Oct.	3,023,370	3,334,132	.....
Nov.	3,023,006	3,236,707	.....
Dec.	3,250,448	3,091,060	.....
Year*	36,403,470	39,070,470	.....

*These totals do not include charcoal pig iron. The 1926 production of this iron was 163,880 tons.



Daily Pig Iron Output in October Was 2.9 Per Cent Less Than in September; Composite Price Again Decreases Slightly

Inclined Line represents the gradually increasing theoretical needs of the country, and shows that production is now below the so-called normal. Dotted line represents THE IRON AGE *composite price*

13 in June, 9 in May and 3 in April. In March there was a net gain of 3 furnaces.

Of the 10 furnaces shut down last month, 5 were Steel Corporation stacks, 4 belonged to independent steel companies and one was a merchant furnace. The 3 furnaces blown in represented one each for the Steel Corporation, the independent companies and the merchant producers.

Possibly Active Furnaces Reduced

The Clinton furnace of the Clinton Iron & Steel Co., Pittsburgh, has been scrapped, which reduces the number of possibly active furnaces from 362 to 361.

Production of Steel Companies for Own Use—Gross Tons

	Total Iron Spiegel and Ferro		Spiegeleisen and Ferromanganese*			
			—1926—		—1927—	
	1926	1927	Fe-Mn	Spiegel	Fe-Mn	Spiegel
Jan. ...	2,599,876	2,343,881	29,129	7,746	31,844	7,486
Feb. ...	2,272,150	2,256,651	22,309	7,084	24,560	7,045
Mar. ...	2,661,092	2,675,417	24,064	7,339	27,834	7,650
Apr. ...	2,677,094	2,637,919	24,134	7,051	24,735	12,907
May ...	2,687,138	2,619,078	23,159	6,999	28,734	9,788
June ...	2,465,583	2,343,409	25,378	5,864	29,232	10,535
½ year.	15,362,933	14,876,355	148,173	42,083	166,939	55,411
July ...	2,461,161	2,163,101	26,877	3,699	26,394	9,350
Aug. ...	2,424,687	2,213,815	23,557	4,372	21,279	9,104
Sept. ..	2,436,733	2,090,200	25,218	2,925	20,675	6,037
Oct. ...	2,578,830	.....	28,473	6,295	....	....
Nov. ...	2,484,620	.....	31,903	7,565	....	....
Dec. ...	2,322,180	.....	31,627	7,157	....	....
Year..	30,071,144	.....	315,828	74,096	....	....

*Includes output of merchant furnaces.

Capacity Active on Nov. 1

On Nov. 1 there were 172 furnaces blowing as compared with 179 on Oct. 1. The estimated daily rate of the 172 furnaces was 87,600 tons per day; on Oct. 1 the 179 furnaces had an estimated rate of 90,800 tons per day.

Manganese Alloy Output

Ferromanganese made in October totaled 17,710 tons, the smallest this year. At no time also in 1926 was so little produced. The spiegeleisen output at 6129 tons last month was a little larger than the 6037 tons in September, which was the smallest this year.

Furnaces Blown In and Out

Only three furnaces were blown in during October: One Edgar Thomson furnace of the Carnegie Steel Co. in the Pittsburgh district; one furnace at the Cambria plant of the Bethlehem Steel Corporation in western Pennsylvania, and the Belfont furnace in southern Ohio.

The following furnaces were blown out or banked during October: The furnace of the Hudson Valley Coke & By-Products Corporation in New York; one Donora furnace of the American Steel & Wire Co., one Edgar Thomson furnace of the Carnegie Steel Co. and one Midland furnace of the Pittsburgh Crucible Steel Co. in the Pittsburgh district; one furnace at the Cambria plant of the Bethlehem Steel Corporation in western Pennsylvania; one furnace of the Youngstown Sheet & Tube Co. in the Mahoning Valley; one (new) South Chicago furnace of the Illinois Steel Co. and one Gary furnace in the Chicago district; one furnace of the Colorado Fuel & Iron Co. in Colorado, and one Bessemer furnace of the Tennessee Coal, Iron & Railroad Co. in Alabama.

Iron and Steel Markets

October Drop in Steel-Making Iron

Close to 4 Per Cent—Steel Business Shows Little Advance—Current Operations Slightly Off—Fewer Price Irregularities—Lower Pig Iron

CLOSE to a 4 per cent reduction from the September rate was made in the output of steel-making pig iron in October. Merchant iron production held its own, however, so that the month's total production showed a 2.9 per cent daily loss from September. Last month 2,784,112 tons was made, or 89,810 tons per day, while for the 30 days of September the amount was 2,774,949 tons, or 92,498 tons a day. Thus October failed to show the expansion usually expected.

The production of steel-making grades averaged 66,991 tons per day, against 69,673 tons in September. The merchant output was 22,819 tons daily in October and 22,825 tons in September.

There was a net loss of seven active stacks, four of them of the Steel Corporation and three belonging to independent steel companies. The 172 furnaces in blast on Nov. 1 were making iron at an 87,600-ton daily rate, while the 179 furnaces in operation Oct. 1 had a capacity of 90,800 tons. On Nov. 1, 1926, there were 219 furnaces in blast producing at a rate of 108,760 tons a day.

The ten months' output of pig iron, 30,888,000 tons, is 5½ per cent under that of the corresponding period of 1926, but 2½ per cent ahead of the first ten months of 1925.

The week in steel has shown here and there an accumulation of orders and some growth in the volume of inquiries, but it is doubtful that the industry as a whole has forged ahead. The betterment gives little promise as yet of helping this year's operations or fourth quarter profits. As November comes in, the rate of operations has receded slightly, for while Pittsburgh holds its position, the Chicago district shows a drop of two points.

Price irregularities are less pronounced than a week ago. Instead there has been some withdrawal of special price concessions expected by some of the large preferential buyers. It remains that prices of sheets, wide hot-rolled strips and nails are none too strong, as Chicago mills discover in competition outside their immediate district. Pipe prices are still somewhat unsettled, and a reduction is looked for in tin plate when prices are announced a few weeks hence. The firmness of ten days ago in alloy steel is lacking.

Oil tank needs are holding first place in demand for plates, although the small size of orders is making for uneconomical mill operations. In fact, in a number of lines, close-range buying has given way to emergency ordering.

Better railroad buying of bars and a slight increase in releases against orders from the automobile makers are reported. And the agricultural implement makers continue to be steady consumers. Inquiries for blue annealed sheets from stamping companies engaged in automobile work are also noteworthy.

In rails, the Burlington has distributed 60,000 tons, 18,000 tons to the Colorado mill and the remainder to the Illinois and Inland steel companies. Over 100,000 tons was placed in Chicago in the past week and fresh inquiries were received for 40,000 tons.

Structural steel awards of the week amounted to 21,500 tons, of which 3200 tons was for a college building at Durham, N. C., and 3000 tons for a manufacturing plant at Elizabethton, Tenn. A new plate project, a pipe line in New Jersey, will require 3000 tons.

In pig iron the trend of prices is still downward. The latest reduction is a cut of $1.25 a ton to $16, base, by Alabama furnaces, the first change at Birmingham since early in July. Lake Erie furnaces continue to ship pig iron by boat to Chicago. Low foundry operations are retarding buying, but there are indications that some melters along the Eastern seaboard are rapidly using up iron carried over from the third quarter. At Detroit, shipments of pig iron in October were larger than in September, reflecting a gain in melt by automotive foundries.

Heavy melting scrap has declined 25c. a ton at Cincinnati, and old material prices are weaker in most other markets. Some dealers are commencing to accumulate scrap in the belief that prices are scraping bottom and a turn is in sight.

Connellsville coke prices are weak as a result of an unusually light demand for both blast furnace and foundry fuel. Mild weather is adversely affecting household demand for coal.

The Lake movement of ore this season up to Nov. 1 was 49,110,133 tons, or 10 per cent less than last year.

A Welsh answer to unsatisfactory British conditions is an important merger of mills now under way. Tin plate, quoted at $4.25 a box, f.o.b. works port, is said to be 24c. less than cost, and 18c. less if foreign steel be used. At the same time, Germany is active with four to five months' orders for steel bars. Our radiogram from Berlin puts present German productive capacity at 18,000,000 tons per annum, or equal to the prewar status, which represented a larger area than comprised in Germany today.

THE IRON AGE composite price for pig iron has fallen from the $17.84 of the last two weeks to $17.54 per gross ton, the lowest in over eleven years. The finished steel composite price remains at last week's five year low point, or 2.293c. per lb.

A Comparison of Prices

Advances Over the Previous Week in Heavy Type, Declines in Italics
At Date, One Week, One Month, and One Year Previous

Pig Iron, Per Gross Ton:	Nov. 1, 1927	Oct. 25, 1927	Oct. 4, 1927	Nov. 1, 1926
No. 2, fdy., Philadelphia	$19.76	$19.76	$20.26	$22.26
No. 2, Valley furnace	17.50	17.50	17.50	19.00
No. 2, Southern, Cin'ti	*19.69*	20.94	20.94	23.69
No. 2, Birmingham	*16.00*	17.25	17.25	20.00
No. 2 foundry, Chicago*	18.50	18.50	19.50	21.00
Basic, del'd eastern Pa.	20.00	20.00	20.00	21.50
Basic, Valley furnace	17.00	17.00	17.00	18.50
Valley Bessemer, del'd P'gh	19.76	19.76	19.76	21.26
Malleable, Chicago*	18.50	18.50	19.50	21.00
Malleable, Valley	17.50	17.50	17.50	19.00
Gray forge, Pittsburgh	18.76	18.76	18.76	20.26
L. S. charcoal, Chicago	27.04	27.04	27.04	27.04
Ferromanganese, furnace	90.00	90.00	90.00	88.00
Rails, Billets, etc., Per Gross Ton:				
O.-h. rails, heavy, at mill	$43.00	$43.00	$43.00	$43.00
Light rails at mill	36.00	36.00	36.00	36.00
Bess. billets, Pittsburgh	33.00	33.00	33.00	35.00
O.-h. billets, Pittsburgh	33.00	33.00	33.00	35.00
O.-h. sheet bars, P'gh	34.00	34.00	34.00	36.00
Forging billets, P'gh	38.00	38.00	39.00	40.00
O.-h. billets, Phila.	38.30	38.30	38.30	40.30
Wire rods, Pittsburgh	42.00	42.00	43.00	45.00
	Cents	Cents	Cents	Cents
Skelp, grvd. steel, P'gh, lb.	1.75	1.75	1.75	1.90
Finished Iron and Steel,				
Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Iron bars, Philadelphia	2.07	2.07	2.07	2.22
Iron bars, Chicago	1.85	1.85	1.90	2.00
Steel bars, Pittsburgh	1.75	1.75	1.75	2.00
Steel bars, Chicago	1.85	1.85	1.85	2.10
Steel bars, New York	2.09	2.09	2.09	2.34
Tank plates, Pittsburgh	1.75	1.75	1.75	1.90
Tank plates, Chicago	1.85	1.85	1.85	2.10
Tank plates, New York	2.09	2.09	2.09	2.24
Beams, Pittsburgh	1.75	1.75	1.75	2.00
Beams, Chicago	1.85	1.85	1.85	2.10
Beams, New York	2.09	2.09	2.09	2.34
Steel hoops, Pittsburgh	2.30	2.30	2.30	2.50

*The average switching charge for delivery to foundries in the Chicago district is 61c. per ton.

Sheets, Nails and Wire,	Nov. 1, 1927	Oct. 25, 1927	Oct. 4, 1927	Nov. 1, 1926
Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Sheets, black, No. 24, P'gh	2.80	2.80	3.00	3.00
Sheets, black, No. 24, Chicago dist. mill	3.00	3.00	3.10	3.20
Sheets, galv., No. 24, P'gh	3.70	3.70	3.85	3.85
Sheets, galv., No. 24, Chicago dist. mill	3.85	3.85	3.95	4.05
Sheets, blue, 9 & 10, P'gh	2.10	2.10	2.15	2.30
Sheets, blue, 9 & 10, Chicago dist mill	*2.25*	2.30	2.35	2.50
Wire nails, Pittsburgh	2.50	2.50	2.55	2.65
Wire nails, Chicago dist. mill	2.55	2.60	2.60	2.70
Plain wire, Pittsburgh	2.40	2.40	2.40	2.50
Plain wire, Chicago dist. mill	2.45	2.45	2.45	2.55
Barbed wire, galv., P'gh	3.20	3.20	3.25	3.35
Barbed wire, galv., Chicago dist. mill	*3.25*	3.30	3.30	3.40
Tin plate, 100 lb. box, P'gh	$5.50	$5.50	$5.50	$5.50
Old Material, Per Gross Ton:				
Heavy melting steel, P'gh	$14.50	$14.50	$15.00	$17.50
Heavy melting steel, Phila.	14.00	14.00	14.00	15.50
Heavy melting steel, Ch'go	11.50	11.50	12.00	13.00
Carwheels, Chicago	*13.25*	13.50	13.75	14.50
Carwheels, Philadelphia	15.50	15.50	15.50	17.00
No. 1 cast, Pittsburgh	14.75	14.75	14.75	16.50
No. 1 cast, Philadelphia	16.50	16.50	16.50	17.50
No. 1 cast, Ch'go (net ton)	*13.50*	14.00	14.50	16.00
No. 1 RR. wrot, Phila.	15.50	15.50	15.50	17.00
No. 1 RR. wrot, Ch'go (net)	*9.75*	10.00	10.50	12.50
Coke, Connellsville, Per Net Ton at Oven:				
Furnace coke, prompt	$2.85	$2.85	$2.85	$5.00
Foundry coke, prompt	4.00	4.00	4.00	6.00
Metals,				
Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Lake copper, New York	13.25	13.25	13.25	14.12½
Electrolytic copper, refinery	13.00	13.00	13.00	13.75
Zinc, St. Louis	*5.80*	5.95	6.00	7.25
Zinc, New York	*6.15*	6.30	6.35	7.60
Lead, St. Louis	5.95	5.95	6.00	7.80
Lead, New York	6.25	6.25	6.25	8.10
Tin (Straits), New York	*57.50*	58.50	59.50	67.50
Antimony (Asiatic), N. Y.	11.00	11.00	11.00	13.25

On export business there are frequent variations from the above prices. Also, in domestic business, there is at times a range of prices on various products, as shown in our market reports on other pages.

Pittsburgh

Orders for Finished Steel More Numerous Than a Month Ago

PITTSBURGH, Nov. 1.—Orders for finished steel are greater numerically than they were a month ago, but the gains do not embrace all products. Steel makers cannot yet look very far ahead in their order books, and while there is a common belief that some time in the next 30 days there will be definite and material improvement in the size of commitments, it is an equally common impression that the betterment will not affect this year's operations or fourth quarter profits. The pressure to sell is still stronger than the desire to purchase, and prices generally are easy and even weaker on some items, notably strips and plates.

Market activity, as measured by ingot production, is substantially the same as it was a week ago. The average of steel works operations is still between 55 and 60 per cent for this and nearby districts. Not much steel is moving in semi-finished form. In finished products, structural shapes are making a rather good showing because, of the major consuming industries, construction work and the agricultural implement trade stand out as the most active. Bar orders are fairly numerous, but individually small. Plates show up poorly in the sales. Little life is observed in the tin plate trade, and in sheets and wire products there is only a fairly good demand, although prices of these products, if prices alone stimulated ordering, are attractive enough to induce purchases.

Sluggishness still marks the movement of the primary materials. There have been few periods in the history of the pig iron industry when there was less interest in the market on the part of melters or when producers had fewer inquiries to figure on. Instead of making new purchases on scrap, melters are holding up shipments against old orders. The combination of unseasonable weather and low industrial consumption has produced dullness bordering on stagnation in the fuel market, and if prices are no lower than they have been, it is chiefly because there has not been enough consumer interest to provide the test.

Pig Iron.—If there is a pig iron market here beyond the occasional carload purchases by melters who never carry a stock, it is not apparent. There is a complete dearth of worthwhile inquiries, and the appearance of a request for prices on as little as 100 tons is an event as important as was an inquiry for several thousand tons in the not distant past. Pig iron prices have weakened in most other markets, but they have not yielded on Valley iron, chiefly because consumers are not interested to the extent of making firm bids and producers see no reason for forcing iron on an unwilling market. W. P. Snyder & Co. make the average prices of Bessemer and basic iron shipped from Valley furnaces in the month of October $18 and $17, against $18 and $17.08 respectively in September.

Prices per gross ton, f.o.b. Valley furnace:

Basic	$17.00
Bessemer	18.00
Gray forge	17.00
No. 2 foundry	17.50
No. 3 foundry	17.00
Malleable	17.50
Low phosphorus, copper free	27.50

Freight rate to the Pittsburgh or Cleveland districts, $1.76.

Ferroalloys.—Some quickening in the specifications against contracts for ferromanganese and spiegeleisen is observed, but market conditions otherwise are unchanged. Consumers are not yet showing any particular interest in 1928 requirements, and producers are not forcing the issue. There is an impression that makers of ferromanganese will seek higher prices, since the lack of profits at the present price is mentioned rather frequently.

Tin Plate.—General line tin plate demands are holding up well, but alone are not sufficient to provide engagement of more than 65 per cent of capacity. Indeed, the rate is that high because some of the mills are producing against early 1928 requirements. The price for the first half of 1928 will probably be announced in the next fortnight, and already there is much speculation as to what it will be. A year ago, the market had the benefit of a strong pig tin market, but the present tin price is approximately 12c. per lb. below its level of a year ago, which would mean 18c. on a standard box of tin plate, while the present price of tin mill black plate is down 25c. per 100 lb. compared with that at this time last year.

Cold-Finished Steel Bars and Shafting.—No material betterment in demand is noted, and until the motor car industry, which accounts for so much tonnage, gets on a heavier production basis, real improvement in sales is not expected. Prices appear steady at 2.20c., base Pittsburgh, for small lots, with a preferential of $2 a ton to large Detroit consumers.

Hot-Rolled Flats.—The market is still holding at 2.30c., base, for hoops and bands, but only on small lots of narrow hoops is that price being paid and even on small lots there is enough competition to produce a price of 2.20c. On wide strips the weakness of sheets and plates is felt. While some business is being placed at 2.10c., there is more business at $2 to $3 a ton less, and where plate mill competition is encountered, an even steeper cut is necessary to secure orders. Business is slow.

Cold-Rolled Strips.—Price unsettlement is taking its toll of business, and the past week is admitted to have been the quietest in some time. Makers generally are observing 1 ton up to 3 tons as the base tonnage, but the base price no longer can be expressed in a single quotation. As low as 2.75c., base Cleveland, is reported on business in Detroit, which would work back to 3c. for lots of 1 up to 3 tons.

The past week has been a better shipment than sales period. Shipments are placed at approximately 51 per cent of capacity, and new business, at 42 per cent.

Semi-Finished Steel.—Continued dullness in billets, slabs and sheet bars is not hard to understand in view of the fact that strip makers who buy their steel are not burdened with business, and lower prices for sheets do not seem to be creating new orders, while tin plate makers are in a seasonally slow period. Producers are not forcing sales, and prices, consequently, are steady. Current shipments of wire rods generally carry prices of $41 to $42, base, with $43 more of an asking than a sales price. On skelp, 1.75c. is now the general market price.

Wire Products.—While general sales make a fairly favorable showing, the explanation is found more in intensive sales efforts than in any appreciable increase in demand. The attempt to put nails on a basis of $2.55 base, per keg, Pittsburgh, appears to have failed, and preservation of $2.50 is now the aim of manufacturers in this district, since they are encountering even lower prices. The market also is irregular on staples and barbed wire, but is fairly steady on plain wire, although the light operations of the motor car industry tell on the demand for that product and also for spring wire.

Tubular Goods.—The market has not yet made a turn. Business is very slow, since there is the usual tapering in the demand for buttwelded pipe incident to the approach of the end of the year, and no quickening in the demand for lapwelded goods. Some price uncertainty still exists, and probably adds to the caution of jobbers and consumers. The 70,000-ton oil pipe line for the Roxana Petroleum Co. is still pending.

Sheets.—Business in the past week has not maintained the improvement of the week before, probably because buyers became convinced that since the recent formal cut of $2 a ton did not halt price concessions, they had nothing to lose waiting a while longer. Mills with headquarters in this city disclaim encountering lower prices than 2.85c., base, on black sheets, but admit that 3.65c., base, on galvanized sheets is more common than it has been, and 2.10c., base, which for a time applied only on the heavier gages of blue annealed sheets, now is extending to all gages. This market still is quotable at 2.85c. to 2.90c., base, on black, 3.65c. to 3.75c., base, on galvanized and 2.10c. to 2.15c., base, on blue annealed, but the top prices are growing harder to obtain. Mill operations are lighter, averaging about 65 per cent of capacity.

Special finishes, the prices of which are predicated on the price of black sheets, which did not immediately respond to the lower black sheet level in the past week, have declined $2 per ton. Metal furniture sheets now are quoted at 4.05c. for "A" grade and 3.85c. for "B" grade.

Bars, Plates and Shapes.—Bar orders are more numerous, but individually are still small. Locally the market is holding fairly well at 1.75c., base, but Pittsburgh mills report encountering 1.70c. in the East. Activity is lacking in plates, and only on small lots is a price of 1.75c. being maintained. Fairly good demand is noted for structural shapes, although fabricating companies are not getting much business out of this immediate district.

Rails and Track Supplies.—The local rail mill is well supplied with orders for winter rollings, but the railroads have not shown the same inclination toward ad-

The Iron Age Composite Prices

Finished Steel

Nov. 1, 1927, 2.293c. a Lb.

One week ago	2.293c.
One month ago	2.346c.
One year ago	2.453c.
10-year pre-war average	1.689c.

Based on steel bars, beams, tank plates, plain wire, open-hearth rails, black pipe and black sheets. These products constitute 86 per cent of the United States output of finished steel.

	High		Low	
1927	2.453c.,	Jan. 4;	2.293c.,	Oct. 25
1926	2.453c.,	Jan. 5;	2.403c.,	May 18
1925	2.560c.,	Jan. 6;	2.396c.,	Aug. 18
1924	2.789c.,	Jan. 15;	2.460c.,	Oct. 14
1923	2.824c.,	Apr. 24;	2.446c.,	Jan. 2

Pig Iron

Nov. 1, 1927, $17.54 a Gross Ton

One week ago	$17.84
One month ago	18.09
One year ago	20.04
10-year pre-war average	15.72

Based on average of basic iron at Valley furnace and foundry irons at Chicago, Philadelphia, Buffalo, Valley and Birmingham.

	High		Low	
1927	$19.71,	Jan. 4;	$17.54,	Nov. 1
1926	21.54,	Jan. 5;	19.46,	July 13
1925	22.50,	Jan. 13;	18.96,	July 7
1924	22.88,	Feb. 26;	19.21,	Nov. 3
1923	30.86,	Mar. 20;	20.77,	Nov. 20

Mill Prices of Finished Iron and Steel Products

Iron and Steel Bars

Soft Steel

	Base Per Lb.
F.o.b. Pittsburgh mills	1.75c.
F.o.b. Chicago	1.85c.
Del'd Philadelphia	2.07c.
Del'd New York	2.09c.
Del'd Cleveland	1.94c.
F.o.b. Cleveland	1.75c.
F.o.b. Birmingham	1.90c. to 2.05c.
C.i.f. Pacific ports	2.35c.
F.o.b. San Francisco mills	2.35c. to 2.40c.

Billet Steel Reinforcing

F.o.b. Pittsburgh mills	1.75c. to 1.85c.
F.o.b. Birmingham	1.95c. to 2.05c.

Rail Steel

F.o.b. mill	1.60c. to 1.75c.
F.o.b. Chicago	1.80c.

Iron

Common iron, f.o.b. Chicago	1.85c.
Refined iron, f.o.b. P'gh mills	2.75c.
Common iron, del'd Philadelphia	2.07c. to 2.12c.
Common iron, del'd New York	2.09c. to 2.14c.

Tank Plates

	Base Per Lb.
F.o.b. Pittsburgh mills	1.75c.
F.o.b. Chicago	1.85c.
F.o.b. Birmingham	1.90c. to 2.00c.
Del'd Cleveland	1.94c.
Del'd Philadelphia	2.07c.
Del'd New York	2.09c.
C.i.f. Pacific ports	2.30c. to 2.40c.

Structural Shapes

	Base Per Lb.
F.o.b. Pittsburgh mills	1.75c.
F.o.b. Chicago	1.85c.
F.o.b. Birmingham	1.90c. to 2.00c.
Del'd Cleveland	1.94c.
Del'd Philadelphia	2.07c.
Del'd New York	2.09c.
C.i.f. Pacific ports	2.35c. to 2.40c.

Hot-Rolled Flats (Hoops, Bands and Strips)

	Base Per Lb.
All gages, narrower than 6 in., P'gh	2.15c. to 2.30c.
All gages, 6 in. to 12 in., P'gh	1.90c. to 2.10c.
Nos. 13 and 14 gage, 12 in. to 14 in., P'gh, net	2.30c.
Nos. 15 and 16 gage, 12 in. to 14 in., P'gh, net	2.40c.
All gages, narrower than 6 in., Chicago	2.40c.
All gages, 6 in. and wider, Chicago,	2.20c. to 2.40c.
Cotton ties, per bundle 45-lb. out of stock, f.o.b. Atlantic ports	$1.21
Cotton ties, per bundle 45-lb. out of stock, f.o.b. Gulf ports	$1.20

*Mills follow plate or sheet prices according to gage on wider than 14 in.

Cold-Finished Steel

	Base Per Lb.
Bars, f.o.b. Pittsburgh mills	2.10c. to 2.20c.
Bars, f.o.b. Chicago	2.10c. to 2.20c.
Bars, Cleveland	2.25c.
Shafting, ground, f.o.b. mill	*2.45c. to 2.90c.
Strips, under 12 in., 1 up to 3 tons, P'gh,	3.00c. to 3.25c.
Strips, under 12 in., 1 up to 3 tons, Cleveland	3.15c. to 3.25c.
Strips, under 12 in., 1 up to 3 tons, del'd Chicago	3.55c.
Strips, under 12 in., 1 up to 3 tons, Worcester	3.40c.
Stripsheets, 12 in. and wider, Pittsburgh mill	3.00c.
Stripsheets, 12 in. and wider, Cleveland mill	3.00c.
Stripsheets, 12 in. and wider, del'd Chicago	3.30c.

*According to size.

Wire Products

(To jobbers in car lots, f.o.b. Pittsburgh and Cleveland)

	Base Per Keg
Wire nails	$2.50 to $2.55
Galvanized nails	4.50 to 4.55
Galvanized staples	3.20 to 3.25
Polished staples	2.95 to 3.00
Cement coated nails	2.50 to 2.55

	Base Per 100 Lb.
Bright plain wire, No. 9 gage	$2.40
Annealed fence wire	2.55
Spring wire	3.40
Galv'd wire, No. 9	3.00
Barbed wire, galv'd	$3.20 to 3.25
Barbed wire, painted	2.95 to 3.00

Chicago district mill and delivered Chicago prices are $1 per ton above the foregoing. Birmingham mill prices $3 a ton higher; Worcester, Mass., mill $3 a ton higher on production of that plant; Duluth, Minn., mill $2 a ton higher; Anderson, Ind., $1 higher.

Woven Wire Fence

Base to Retailers Per Net Ton

F.o.b. Pittsburgh	$65.00
F.o.b. Cleveland	65.00
F.o.b. Anderson, Ind.	66.00
F.o.b. Chicago district mills	67.00
F.o.b. Duluth	68.00
F.o.b. Birmingham	68.00

Sheets

Blue Annealed

	Base Per Lb.
Nos. 9 and 10, f.o.b. Pittsburgh	2.10c. to 2.15c.
Nos. 9 and 10, f.o.b. Chicago dist. mill	2.25c.
Nos. 9 and 10, del'd Philadelphia	2.42c. to 2.47c.
Nos. 9 and 10, f.o.b. Birmingham	2.35c.

Box Annealed, One Pass Cold Rolled

No. 24, f.o.b. Pittsburgh	2.75c. to 2.90c.
No. 24, f.o.b. Chicago dist. mill	3.00c.
No. 24, del'd Philadelphia	3.07c. to 3.22c.
No. 24, f.o.b. Birmingham	3.10c.

Metal Furniture Sheets

No. 24, f.o.b. Pittsburgh, A grade	4.05c.
No. 24, f.o.b. Pittsburgh, B grade	3.85c.

Galvanized

No. 24, f.o.b. Pittsburgh	3.65c. to 3.75c.
No. 24, f.o.b. Chicago dist. mill	3.85c.
No. 24, del'd Philadelphia	3.97c. to 4.07c.
No. 24, f.o.b. Birmingham	3.95c. to 4.00c.

Tin Mill Black Plate

No. 28, f.o.b. Pittsburgh	2.90c. to 3.00c.
No. 28, f.o.b. Chicago dist. mill	3.00c. to 3.10c.

Automobile Body Sheets

No. 20, f.o.b. Pittsburgh	4.15c.

Long Ternes

No. 28, 8-lb. coating, f.o.b. mill	4.20c.

Tin Plate

	Per Base Box
Standard cokes, f.o.b. P'gh district mills	$5.50
Standard cokes, f.o.b. Gary and Elwood, Ind.	5.60

Terne Plate

(F.o.b. Morgantown or Pittsburgh)

(Per package, 20 x 28 in.)

8-lb. coating I.C. $11.40	25-lb. coating I.C. $17.30
15-lb. coating I.C. 14.45	30-lb. coating I.C. 18.75
20-lb. coating I.C. 15.80	40-lb. coating I.C. 20.85

Alloy Steel Bars

(F.o.b. Pittsburgh, Chicago or Ohio Mill)

S. A. E. Series Numbers		Base Per 100 Lb.
2100*	(1½% Nickel, 0.10% to 0.20% Carbon)	$2.90 to $3.00
2300	(3½% Nickel)	4.00 to 4.20
2500	(5% Nickel)	5.00 to 5.25
3100	(Nickel Chromium)	3.00 to 3.20
3200	(Nickel Chromium)	4.75 to 5.00
3300	(Nickel Chromium)	6.75 to 7.00
3400	(Nickel Chromium)	6.00 to 6.25
5100	(Chromium Steel)	3.10 to 3.20
5200*	(Chromium Steel)	7.00 to 7.50
6100	(Chrom. Vanadium bars)	4.00 to 4.20
6100	(Chrom. Vanad. spring steel)	3.60 to 3.80
9250	(Silicon Manganese spring steel)	3.00 to 3.15
	Carbon Vanadium (0.45% to 0.55% Carbon, 0.15% Vanad.)	4.10 to 4.20
	Nickel Chrome Vanadium (0.60 Nickel, 0.50 Chrom., 0.15 Vanad.)	4.10 to 4.30
	Chromium Molybdenum bars (0.80—1.10 Chrom., 0.25—0.40 Molyb.)	4.00 to 4.25
	Chromium Molybdenum bars (0.50—0.70 Chrom., 0.15—0.25 Molyb.)	3.10 to 3.20
	Chromium Molybdenum spring steel (1 — 1.25 Chrom., 0.30 — 0.50 Molybdenum)	4.50 to 4.75

Above prices are for hot-rolled steel bars, forging quality. The ordinary differential for cold-drawn bars is 1c. per lb. higher. For billets 4 x 4 to 10 x 10 in. the price for a gross ton is the net price for bars of the same analysis. For billets under 4 x 4 in. down to and including 2½-in. squares, the price is $5 a gross ton above the 4 x 4 billet price.

*Not S. A. E. specification, but numbered by manufacturers to conform to S. A. E. system.

Rails

	Per Gross Ton
Standard, f.o.b. mill	$43.00
Light (from billets), f.o.b. mill	36.00
Light (from rail steel), f.o.b. mill	34.00
Light (from billets), f.o.b. Ch'go mill	36.00

Track Equipment

	Base Per 100 Lb.
Spikes, ⅝ in. and larger	$2.80
Spikes, ½ in. and smaller	$2.80 to 3.00
Spikes, boat and barge	3.10
Tie plates, steel	2.25
Angle bars	2.75
Track bolts, to steam railroads	3.80 to 4.00
Track bolts, to jobbers, all sizes, per 100 count,	70 per cent off list

Welded Pipe

Base Discounts, f.o.b. Pittsburgh District and Lorain, Ohio, Mills

Butt Weld

Steel Inches	Steel Black	Steel Galv.	Iron Inches	Iron Black	Iron Galv.
⅛	45	19½	¼ to ⅜	+11	+39
¼ to ⅜	51	25½	½	22	2
½	56	42½	¾	28	11
¾	60	48½	1 to 1½	30	13
1 to 3	62	50½			

Lap Weld

2	56	43½	2	23	7
2½ to 6	59	47½	2½	26	11
7 and 8	56	43½	3 to 6	28	13
9 and 10	45	32½	7 to 12	26	11
11 and 12	53	40½			

Butt Weld, extra strong, plain ends

⅛	41	24½	¼ to ⅜	+19	+54
¼ to ⅜	47	30½	½	21	17
½	53	42½	¾	28	12
¾	58	47½	1 to 1½	30	14
1 to 1½	60	49½			
2 to 3	61	50½			

Lap Weld, extra strong, plain ends

2	53	42½	2	23	9
2½ to 4	57	46½	2½ to 4	29	15
4½ to 6	56	45½	4½ to 6	28	14
7 to 8	52	39½	7 to 8	21	15
9 and 10	45	32½	9 to 12	16	2
11 and 12	44	31½			

To the large jobbing trade the above discounts on steel pipe are increased on black by one point, with supplementary discount of 5 and 5%, and on galvanized by 1½ points, with supplementary discount of 5%. On iron pipe, both black and galvanized, the above discounts are increased to large jobbers by one point with supplementary discounts of 5 and 2½%.

Note.—Chicago district mills have a base two points less than the above discounts. Chicago delivered base is 2½ points less. Freight is figured from Pittsburgh, Lorain, Ohio, and Chicago district mills, the billing being from the point producing the lowest price to destination.

Boiler Tubes

Base Discounts, f.o.b. Pittsburgh

Lap Welded Steel		Charcoal Iron	
2 to 2¼ in.	27	1½ in.	+18
2½ to 2¾ in.	37	1¾ to 1⅞ in.	+ 8
3 in.	40	2 to 2¼ in.	— 2
3¼ to 3¾ in.	42½	2½ to 3 in.	— 7
4 to 13 in.	46	3¼ to 4½ in.	— 9

Beyond the above discounts, 7 fives extra are given on lap welded steel tubes and 2 tens to 2 tens and 1 five on charcoal iron tubes.

Standard Commercial Seamless Boiler Tubes

Cold Drawn

1 in.	60	3 in.	45
1¼ to 1½ in.	52	3½ to 3½ in.	47
1¾ in.	36	4 in.	50
2 to 2¼ in.	31	4½, 5 and 6 in.	45
2½ to 2¾ in.	39		

Hot Rolled

2 and 2¼ in.	37	3¼ and 3½ in.	53
2½ and 2¾ in.	45	4 in.	56
3 in.	51	4½, 5 and 6 in.	51

Less carloads, 4 points less. Add $8 per net ton for more than four gages heavier than standard. No extra for lengths up to and including 24 ft. Sizes smaller than 1 in. and lighter than standard gage to be held at mechanical tubes list and discount. Intermediate sizes and gages not listed take price of next larger outside diameter and heavier gage.

Seamless Mechanical Tubing

	Per Cent Off List
Carbon, 0.10% to 0.30%, base	55
Carbon, 0.30% to 0.40%, base	50

Plus differentials for lengths over 18 ft. and for commercially exact lengths. Warehouse discounts on small lots are less than the above.

vance ordering of the accessories, and the market for spikes, tie plates and track bolts is very dull. Prices are holding, but are not being seriously tested.

Old Material.—The market is not merely dull; it is almost stagnant, and except for some small purchases of heavy melting steel by one or two Pittsburgh district steel companies at $14.50, there has been nothing to break the monotony. On that grade not more than $14.50 is now obtainable from either mills or dealers, and there has been a corresponding revision downward of other grades that move with it. On compressed sheets $14 is now as much as can be obtained. Scrap rails cannot be sold for more than $14. There is still a dealer demand for machine shop turnings that sustains the price. The Pennsylvania Railroad's November scrap list contains approximately 30,000 gross tons, and that of the Baltimore & Ohio, 25,900 gross tons.

Prices per gross ton delivered consumers' yards in Pittsburgh and points taking the Pittsburgh district freight rate:

Basic Open-Hearth Furnace Grades:	
Heavy melting steel	$14.50
Scrap rails	14.00
Compressed sheet steel	14.00
Bundled sheets, sides and ends	13.00
Cast iron carwheels	$14.50 to 15.00
Sheet bar crops, ordinary	14.50
Heavy breakable cast	13.75 to 14.00
No. 2 railroad wrought	14.00
Heavy steel axle turnings	13.00 to 13.50
Machine shop turnings	11.50 to 12.00
Acid Open-Hearth Furnace Grades:	
Railroad knuckles and couplers	16.00 to 16.50
Railroad coil and leaf springs	16.00 to 16.50
Rolled steel wheels	16.00 to 16.50
Low phosphorus billet and bloom ends	19.00 to 19.50
Low phosphorus, mill plate	18.50 to 19.00
Low phosphorus, light grade	17.00 to 17.50
Low phosphorus sheet bar crops	18.00 to 18.50
Heavy steel axle turnings	13.00 to 13.50
Electric Furnace Grades:	
Low phosphorus punchings	16.75 to 17.00
Heavy steel axle turnings	13.00 to 13.50
Blast Furnace Grades:	
Short shoveling steel turnings	11.50 to 12.00
Short mixed borings and turnings	11.00 to 11.50
Cast iron borings	11.00 to 11.50
No. 2 busheling	9.00 to 9.50
Rolling Mill Grades:	
Steel car axles	19.00 to 19.50
No. 1 railroad wrought	11.50 to 12.00
Sheet bar crops	17.00 to 17.50
Cupola Grades:	
No. 1 cast	14.75 to 15.25
Rails 3 ft. and under	15.00 to 15.50
Malleable Grades:	
Railroad	14.50 to 14.75
Industrial	14.00 to 14.50
Agricultural	13.50 to 14.00

Bolts, Nuts and Rivets.—Makers of large rivets are now quoting $3, base, per 100 lb. on new business. Most buyers took advantage of the opportunity to contract for this quarter at $2.75, base, and the higher price naturally is not finding much basis in sales. Business in this product, as well as in bolts and nuts, is slow.

Warehouse Business.—Some pickup in orders is noted, and with most companies October business made a slight gain over that of the month before. No change has been made in the price schedule, but it is subject to more or less shading. Indeed, the declines in mill prices for the most part are being used as a basis for concessions in resale prices rather than in a formal reduction in the warehouse schedules.

Coke and Coal.—The market in both coal and coke is very dull. Almost no demand exists for blast furnace coke and there is only a limited call for foundry grade. Prices are not quotably changed, but the market is easy. Mild weather is cutting into the household demand for coal, and there is less than the usual industrial demand, since industrial activity is at a low stage and most manufacturing companies still have some of the coal stocked against strike emergencies.

Warehouse Prices, f.o.b. Pittsburgh

	Base per Lb.
Plates	3.00c.
Structural shapes	3.00c.
Soft steel bars and small shapes	2.90c.
Reinforcing steel bars	2.75c.
Cold-finished and screw stock—	
Rounds and hexagons	3.60c.
Squares and flats	4.10c.
Bands	3.60c.
Hoops	4.00c. to 4.50c.
Black sheets (No. 24 gage), 25 or more bundles	3.65c.
Galvanized sheets (No. 24 gage), 25 or more bundles	4.50c.
Blue annealed sheets (No. 10 gage), 25 or more sheets	3.20c.
Spikes, large	3.30c. to 3.40c.
Small	3.80c. to 5.25c.
Boat	3.80c.
Track bolts, all sizes, per 100 count,	62½ per cent off list
Machine bolts, per 100 count	62½ per cent off list
Carriage bolts, per 100 count	62½ per cent off list
Nuts, all styles, per 100 count,	62½ per cent off list
Large rivets, base per 100 lb.	$3.50
Wire, black soft annealed, base per 100 lb.	2.90
Wire, galvanized soft, base per 100 lb.	2.90
Common wire nails, per keg	$2.80 to 2.90
Cement coated nails, per keg	2.85 to 2.95

CHANGES IN WORK-WEEK

Decrease in Working Hours in 1926 Compared With Previous Years

IN an exhaustive report on "Wages and Hours of Labor in the Iron and Steel Industry: 1907 to 1926," the Bureau of Labor statistics department says that when 1926 is compared with 1924, decreases in the proportion of employees working over 60 hr. a week regularly are noted in blast furnaces and open-hearth departments. Puddling mills, plate, rail, bar and sheet mills, showed decreases, also. In Bessemer converters the percentage increased from 5 to 9, in blooming mills from 13 to 14 and in tin plate mills from 2 to 3. The decreases ranged from 1 per cent in blast furnaces and two per cent in the open-hearth department to 8 per cent in the standard rail mill department.

All departments have been combined for 1924 and 1926 only. In all departments, only 15 per cent of all employees in 1924 had a full-time week of more than 60 hr. and only 13 per cent of all employees in 1926.

In 1922, the report states, 79 per cent of the employees in blast furnaces, 77 per cent in Bessemer converters, 79 per cent in open-hearth furnaces, 69 per cent in blooming mills, 61 per cent in plate mills, 53 per cent in standard rail mills, and 51 per cent in bar mills still were on a basis of more than 60 hr. a week. Following the reduction in 1923, however, it is pointed out, only 24 per cent of the employees in blast furnaces, 5 per cent in Bessemer converters, 19 per cent in open-hearth furnaces, 13 per cent in blooming mills, 23 per cent in plate mills, 21 per cent in standard rail mills and 13 per cent in bar mills were on that basis. In puddling, sheet and tin plate mills the percentages were 12, 11 and 2, respectively. The changes since that period, as shown, are then pointed out.

Figures for 1926 relate to ten departments—blast furnaces, Bessemer converters, open-hearth furnaces, puddling mills, blooming mills, plate mills, standard rail mills, bar mills, sheet mills and tin plate mills. They were obtained from 199 plants or departments and covered 75,109 wage earners. Comparing 1926 conditions with those of 1913, used as the base year (index number 100) the report shows that full time hours per week for all departments in 1926 were 54.4, against 66.1 in 1913. Earnings per hour were 63.7c. and 30.1c., respectively, while full-time weekly earnings were $34.41 and $18.89, respectively.

Eaton, Rhodes & Co., pig iron and coke dealers, will close their Pittsburgh office Nov. 1. J. G. Walton and J. F. McCrory, who represent the company in the Pittsburgh territory, will retain their residence in Pittsburgh and will continue their association with the company.

Semi-Finished Steel, Raw Materials, Bolts and Rivets

Mill Prices of Semi-Finished Steel

F.o.b. Pittsburgh or Youngstown

Billets and Blooms

	Per Gross Ton
Rerolling, 4-in. and over	$33.00
Rerolling, under 4-in. to and including 1¾ in.	$33.50 to 34.00
Forging, ordinary	38.00 to 39.00
Forging, guaranteed	43.00 to 44.00

Sheet Bars

	Per Gross Ton
Open-hearth or Bessemer	$34.00

Slabs

	Per Gross Ton
8 in. x 2 in. and larger	$33.00
Smaller than 8 in. x 2 in.	34.00

Skelp

	Per Lb.
Grooved	1.75c.
Sheared	1.75c.
Universal	1.75c.

Wire Rods

	Per Gross Ton
*Common soft, base	$41.00 to $43.00
Screw stock	$5.00 per ton over base
Carbon 0.20% to 0.40%	3.00 per ton over base
Carbon 0.41% to 0.55%	5.00 per ton over base
Carbon 0.56% to 0.75%	7.50 per ton over base
Carbon over 0.75%	10.00 per ton over base
Acid	15.00 per ton over base

*Chicago mill base is $42 to $43. Cleveland mill base, $40 to $42.

Prices of Raw Material

Ores

Lake Superior Ores, Delivered Lower Lake Ports

	Per Gross Ton
Old range Bessemer, 51.50% iron	$4.55
Old range non-Bessemer, 51.50% iron	4.40
Mesabi Bessemer, 51.50% iron	4.40
Mesabi non-Bessemer, 51.50% iron	4.25
High phosphorus, 51.50% iron	4.15

Foreign Ore, c.i.f. Philadelphia or Baltimore

	Per Unit
Iron ore, low phos., copper free, 55 to 58% iron in dry Spanish or Algeria	10.50c.
Iron ore, Swedish, average 66% iron,	9.75c. to 10.00c.
Manganese ore, washed, 52% manganese, from the Caucasus	39c. to 40c.
Manganese ore, Brazilian, African or Indian, basis 50%	38c. to 39c.
Tungsten ore, high grade, per unit, in 60% concentrates	$10.10 to $10.35

	Per Gross Ton
Chrome ore, 45 to 50% Cr_2O_3, crude, c.i.f. Atlantic seaboard	$22.00 to $24.00

	Per Lb.
Molybdenum ore, 85% concentrates of MoS_2, delivered	50c. to 55c.

Coke

	Per Net Ton
Furnace, f.o.b. Connellsville prompt	$2.75 to $3.00
Foundry, f.o.b. Connellsville prompt	3.75 to 4.50
Foundry, by-product, Ch'go ovens	9.75
Foundry, by-product, New England, del'd	12.00
Foundry, by-product, Newark or Jersey City, delivered	9.46 to 10.77
Foundry, Birmingham	5.50
Foundry, by-product, St. Louis	9.75

Coal

	Per Net Ton
Mine run steam coal, f.o.b. W. Pa. mines	$1.40 to $1.90
Mine run coking coal, f.o.b. W. Pa. mines	1.65 to 1.85
Mine run gas coal, f.o.b. Pa. mines	1.85 to 2.00
Steam slack, f.o.b. W. Pa. mines	0.90 to 1.00
Gas slack, f.o.b. W. Pa. mines	1.10 to 1.25

Ferromanganese

	Per Gross Ton
Domestic, 80%, furnace or seab'd	$90.00
Foreign, 80%, Atlantic or Gulf port, duty paid	90.00

Spiegeleisen

	Per Gross Ton Furnace
Domestic, 19 to 21%	$30.00 to $31.00
Domestic, 16 to 19%	29.00 to 30.00

Electric Ferrosilicon

	Per Gross Ton Delivered
50%	$85.00 to $87.50
75%	145.00

	Per Gross Ton Furnace		Per Gross Ton Furnace
10%	$35.00	12%	$39.00
11%	37.00	14 to 16%	$45 to 46.00

Bessemer Ferrosilicon

F.o.b. Jackson County, Ohio, Furnace

	Per Gross Ton Furnace		Per Gross Ton Furnace
10%	$32.00	12%	$36.00
11%	34.00		

Silvery Iron

F.o.b. Jackson County, Ohio, Furnace

	Per Gross Ton Furnace		Per Gross Ton Furnace
6%	$25.00	10%	$30.00
7%	26.00	11%	32.00
8%	27.00	12%	34.00
9%	28.00		

Other Ferroalloys

Ferrotungsten, per lb. contained metal, del'd	93c. to 95c.
Ferrochromium, 4 to 6% carbon and up, 65 to 70% Cr., per lb. contained Cr. delivered, in carloads	11.50c.
Ferrovanadium, per lb. contained vanadium, f.o.b. furnace	$3.15 to $3.65
Ferrocarbontitanium, 15 to 18%, per net ton, f.o.b. furnace, in carloads	$200.00
Ferrophosphorus, electric or blast furnace material, in carloads, 18%, Rockdale, Tenn., base, per net ton	$91.00
Ferrophosphorus, electric, 24%, f.o.b. Anniston, Ala., per net ton	$122.50

Fluxes and Refractories

Fluorspar

	Per Net Ton
Domestic, 85% and over calcium fluoride, not over 5% silica, gravel, f.o.b. Illinois and Kentucky mines	$16.00
No. 2 lump, Illinois and Kentucky mines	$20.00
Foreign, 85% calcium fluoride, not over 5% silica, c.i.f. Atlantic port, duty paid	$16.00
Domestic, No. 1 ground bulk, 95 to 98% calcium fluoride, not over 2½% silica, f.o.b. Illinois and Kentucky mines	$32.50

Fire Clay

	Per 1000 f.o.b. Works	
	First Quality	Second Quality
Pennsylvania	$43.00 to $46.00	$35.00 to $38.00
Maryland	43.00 to 46.00	35.00 to 38.00
New Jersey	50.00 to 65.00	———
Ohio	43.00 to 46.00	35.00 to 38.00
Kentucky	43.00 to 46.00	35.00 to 38.00
Missouri	43.00 to 46.00	35.00 to 38.00
Illinois	43.00 to 46.00	35.00 to 38.00
Ground fire clay, per ton	7.00	

Silica Brick

	Per 1000 f.o.b. Works
Pennsylvania	$43.00
Chicago	52.00
Birmingham	50.00
Silica clay, per ton	$8.50 to 10.00

Magnesite Brick

	Per Net Ton
Standard sizes, f.o.b. Baltimore and Chester, Pa.	$65.00
Grain magnesite, f.o.b. Baltimore and Chester, Pa.	40.00

Chrome Brick

	Per Net Ton
Standard size	$45.00

Mill Prices of Bolts, Nuts, Rivets and Set Screws

Bolts and Nuts

Per 100 Pieces

(F.o.b. Pittsburgh, Cleveland, Birmingham or Chicago)

	Per Cent Off List
†Machine bolts	70
†Carriage bolts	70
Lag bolts	70
Plow bolts, Nos. 1, 2, 3 and 7 heads	70
Hot-pressed nuts, blank or tapped, square	70
Hot-pressed nuts, blank or tapped, hexagon	70
C.p.c. and t. square or hex. nuts, blank or tapped	70
Washers*	6.75c. to 6.50c. per lb. off list

*F.o.b. Chicago, New York and Pittsburgh.
†Bolts with rolled threads up to and including ⅝ in. x 6 in. take 10 per cent lower list prices.

Bolts and Nuts

	Per Cent Off List
Semi-finished hexagon nuts	70
Semi-finished hexagon castellated nuts, S.A.E.	70
Stove bolts in packages	80, 10 and 5
Stove bolts in bulk	80, 10, 5 and 2½
Tire bolts	60, 5 and 5

Discount of 70 per cent off on bolts and nuts applies on carload business. For less than carload orders discounts of 55 to 60 per cent apply.

Large Rivets

(½-In. and Larger)

	Base per 100 Lb.
F.o.b. Pittsburgh or Cleveland	$2.75 to $3.00
F.o.b. Chicago	2.85 to 3.10

Small Rivets

(7/8-In. and Smaller)

	Per Cent Off List
F.o.b. Pittsburgh	70, 10 and 5
F.o.b. Cleveland	70, 10 and 5 to 70 and 10
F.o.b. Chicago	70, 10, 10 and 5 to 70 and 10

Cap and Set Screws

(Freight allowed up to but not exceeding 50c. per 100 lb. on lots of 200 lb. or more)

	Per Cent Off List
Milled cap screws	80, 10 and 10
Milled standard set screws, case hardened,	80 and 10
Milled headless set screws, cut thread	80
Upset hex. head cap screws, U.S.S. thread,	85 and 5
Upset hex. cap screws, S.A.E. thread	85 and 5
Upset set screws	80, 10 and 10
Milled studs	70 and 5

Chicago

Mills Book 175,000 Tons of Rails—Two More Cargoes of Pig Iron Arrive

CHICAGO, Nov. 1.—Weak spots are again appearing in the Chicago iron and steel market. A leaning toward lower prices is distinctly noticeable in sheets, nails and pig iron. Ingot production held at 65 per cent of capacity for only one week, and 63 per cent is now the average in this district. New orders in finished steel products are spotty and are not distributed in proportion to plant capacity among the various producers. While some mills report sales equal to current output, others find that purchases are dragging and have been forced to cut their rolling schedules. In some instances close-range buying has given way to emergency orders, and this has further complicated the arrangement of rolling schedules and has narrowed margins of profit.

The count of active steel mill blast furnaces stands at 20 out of a total of 36 in this district. Two furnaces that were banked in October in the hope that business early in November would justify their being brought back into service are still on the inactive list. The reconstruction and enlargement of the Inland Steel Co.'s No. 2 stack is nearing completion.

Of outstanding interest in the building field this week was the award of 1400 tons of steel for the Shedd aquarium at Chicago.

Pig Iron.—In many instances melters are finding that fourth quarter obligations will carry them well into the first quarter, and interest is now centering in the advisability of covering at present prices up to the fourth and even the fifth month of 1928. Inquiry in the making for future delivery is more promising than for many months past. New buying at the moment is not heavy in and near Chicago, but in outlying territory where prices have softened several large tonnages have been placed. One buyer has purchased 2500 tons of foundry iron for delivery in Iowa at a figure reported to be close to $18, Chicago, and 3000 tons to 5000 tons for delivery in Michigan was placed with Eastern producers. The order for Iowa was split between Chicago and St. Louis furnaces and the freight differential in favor of Chicago was about 70c. Liberal concessions in prices are being made on local iron that is being shipped into competitive territory, notably to the east and southeast. Over 7000 tons of pig iron has arrived at Chicago in two boatloads. While part of this was booked in advance, a portion is being sold from the dock. Reports indicate that at least two more boats are due before the end of the navigation season. Buyers report that charcoal iron has been offered at less than $24, furnace, but miscellaneous sales of 50 to 100 tons this week indicate that that price is holding. Silvery purchases are confined to small lots. Southern iron has been reduced to $16, base Birmingham.

Prices per gross ton at Chicago:

Northern No. 2 foundry, sil. 1.75 to 2.25	$18.50
N'th'n No. 1 fdy., sil. 2.25 to 2.75	19.00
Malleable, not over 2.25 sil.	18.50
High phosphorus	18.50
Lake Superior charcoal, averaging sil. 1.50	27.04
Southern No. 2 fdy. (all rail)	22.01
Southern No. 2 (barge and rail)	20.18
Low phos., sil. 1 to 2 per cent, copper free	$30.50 to 31.00
Silvery, sil. 8 per cent	31.79
Bessemer ferrosilicon, 14 to 15 per cent	46.79

Prices are delivered consumers' yards except on Northern foundry, high phosphorus and malleable which are f.o.b. local furnace, not including an average switching charge of 61c. per gross ton.

Ferroalloys.—A small stock of English ferromanganese has been placed at $88, seaboard. No importations are reported at that price, and generally the market appears to be well established at $90, seaboard. Spiegeleisen is being taken only in carload lots.

Prices delivered Chicago: 80 per cent ferromanganese, $97.56; 50 per cent ferrosilicon, $85 to $87.50; spiegeleisen, 18 to 22 per cent, $37.76 to $38.76.

Plates.—Oil tankage requirements continue to hold first place in interest in a market in which most orders are of unusually small size and make for uneconomical mill operations. An oil producer in Texas now estimates his needs in plates as between 8000 and 10,000 tons. Specifications from car builders have dwindled until they are now of little more interest than any one of the other miscellaneous orders that are received from day to day. It is reported but not confirmed that the Chicago & North Western will soon come into the market for 750 freight cars, this number being in addition to the 500 hopper car bodies inquired for last week. A fair amount of plate tonnage is being taken by the railroads, many of which have well defined car repair programs under way. New business in plates is about equal to production, which is lagging only a trifle below the current rate of ingot output.

Mill prices on plates per lb.: 1.85c., base, Chicago.

Structural Material.—Prices for fabricated steel are low, and competition for going tonnages is keen. This last factor is making for a weaker market in spite of the fact that practically every shop complains that profits are out of the question at the present levels. Prices on plain material are taking a better stand, and cutting is less prevalent in outlying territory, this being particularly noticeable in and around Indianapolis, Ind., which long has been one of the battle grounds between Eastern and mid-Western mills. Competition to the west of Chicago is severe, as local producers are making a firm bid for business which is also open to mills further west. In one respect the plight of fabricating shops is not so bad as indicated by the absence of awards ranging from 100 tons upward. Steel in small lots is finding an ever increasing use in dwellings and in apartment buildings, where beams and basement columns are needed for fireproof construction and quick erection. Fabricators doing this class of work find competition less keen and prices that are quite favorable to profitable operations. From some lines in the manufacturing trade, specifications for structural shapes showed an increase this week. The aggregate is not large, however, and since all orders are for immediate delivery, no indication is given as to the possible trend in the weeks to come. The only fresh inquiry of note locally is for 800 tons for a Catholic high school.

Mill prices on plain material per lb.: 1.85c., base Chicago.

Bolts, Nuts and Rivets.—This has been a good week from the viewpoint of specifications from the railroads. Shipments to manufacturers of agricultural machinery are steady, but in other quarters requirements are smaller. The gains have balanced the losses, however, and the operations of the industry remain at 60 per cent of capacity. Prices are showing a fair degree of stability except possibly in large rivets. Specifications for small rivets are rather liberal, representing a demand slightly above that for bolts, nuts or large rivets.

Cast Iron Pipe.—St. Clair Shores, Mich., has divided 1500 tons of 6-in. and 1800 tons of 8-in. pipe between the National Cast Iron Pipe Co. and the United States Cast Iron Pipe & Foundry Co. Following the recommendation reported last week, Detroit has placed 3600 tons of 12-in. pipe with the American Cast Iron Pipe Co. and the National Cast Iron Pipe Co. Producers are aiming at higher prices, namely, $28 to $30, Birmingham, for 6-in. and larger diameters, but it is admitted that competition for certain sizes is resulting in the taking of a fair proportion of going tonnage at prices that range from $26 to $27, Birmingham, or $34.20 to $35.20, delivered Chicago. Miscellaneous orders are in good number, and for business of this kind the price level is $1 to $2 above that on public lettings. Several public utilities have placed orders for gas pipe, and some inquiry from that source is still pending. Deliveries range from 10 to 40 days, depending on the size.

Prices per net ton, delivered Chicago: Water pipe, 6-in. and over, $34.20 to $37.20; 4-in., $38.20 to $41.20; Class A and gas pipe, $4 extra.

Wire Products.—Nothing more can be said of the wire business, except that it is in unchanged volume, with weakness appearing in the prices of some wire products, notably nails. To the east of Chicago this condition prevails on coated nails, while throughout the Central West all grades of nails are quite commonly

quoted at $2.55, Chicago, though producers still insist that $2.60 is the price which they are trying to maintain and at which they are booking a fair tonnage. October closes with shipments from mills about equal to the corresponding month a year ago. Jobbing trade is spotty. Demand from some parts of the South is rather active, and the Northwest and Missouri River Valley are sending in larger orders. As a general rule, buyers are more conservative near the larger cities in the Central West than in the rural districts.

Rails and Track Supplies.—Several railroads, all of which have terminals at Chicago, have closed for 175,000 tons of standard-section rails. Included in the above is a purchase by the Chicago, Burlington & Quincy of 60,000 tons, of which 28,500 tons will be rolled by the Illinois Steel Co., 13,500 tons by the Inland Steel Co., and 18,000 tons by the Colorado Fuel & Iron Co. Fresh inquiry stands at 40,000 tons, and in addition there is still the 190,000 tons to be purchased by the New York Central. Releases against 1928 contracts have not been large, and as a result rail mill output has not increased in the past week or 10 days. In some quarters it is estimated that production will not show a material gain for at least 30 days. Purchases of track supplies are dragging. Inquiry is large, but sales this week were confined to miscellaneous lots, aggregating 5000 tons. The iron tie plate market is listless. Light rails are in fair demand, and though total sales are not large as compared to the corresponding periods in years past, nevertheless the volume is regarded as satisfactory when comparison is made with the lean months prior to September.

Prices f.o.b. mill, per gross ton: Standard-section open-hearth and Bessemer rails, $43; light rails, rolled from billets, $36. *Per Lb.:* Standard railroad spikes, 2.80c.; track bolts with square nuts, 3.80c.; steel tie plates, 2.25c.; angle bars, 2.75c.

Sheets.—Competition in this commodity now centers more among producers of sheets than between sheet mills and those that make stripsheets. Quotations in Chicago are 3.90c. for galvanized, 3.05c. for black and 2.30c. for blue annealed sheets. Little difficulty is encountered in obtaining these prices in most of this territory, but to the east and south weakness is pronounced in the galvanized and blue annealed finishes. Orders this week are in small volume, and unless order mails increase sharply the outlook is for a reduction in hot mill production from the present rate of 70 per cent of capacity.

Base prices per lb., delivered from mill in Chicago: No. 24 black, 3.05c.; No. 24 galvanized, 3.90c.; No. 10 blue annealed, 2.30c. Delivered prices at other Western points are equal to the freight from Gary plus the mill prices, which are 5c. per 100 lb. lower than the Chicago delivered prices.

Bars.—Demand for soft steel bars is lighter, and output is no longer at a higher rate than ingot production. Specifications from the implement trade are steady, and this group of buyers is easily the outstanding one in this district. Business emanating from automobile manufacturers and those who make parts is spotty and, for the most part, represents emergency orders that must be placed to balance stocks. Several railroads have placed sizable orders for soft iron bars, making the week one of the most active in months in that product. The easier tone of the alloy steel bar market is now being felt in prices, which do not have the firmness shown a week or 10 days ago. The rail steel bar market is inactive, except for specifications from a few small users and industries, such as barn equipment and agricultural machinery builders that cater to farmers. Both Chicago Heights mills continue to operate on double turn, but new buying is lagging behind shipments.

Mill prices per lb.: Soft steel bars, 1.85c., base, Chicago; common bar iron, 1.85c., base, Chicago; rail steel bars, 1.80c., base, Chicago.

Reinforcing Bars.—In the matter of large tonnage awards this market is in a state of suspense. A number of projects have taken definite form and may drop at any moment, but in the meantime distributers must be contented with a fair run of small-tonnage contracts. It is quite noticeable that fresh inquiry is falling off at a rapid rate, so that dealers have come to look upon future business as being largely dependent on the release of tonnage that has been before the trade for some time past. Shipments from warehouses are steady, and backlogs are shrinking. Prices are spotty and lean generally toward the weak side. Awards and fresh inquiries are shown on page 1274.

Old Material.—As the week opens new buying in scrap is in smaller volume and it is becoming increasingly difficult to place tonnage that is coming out on track. Buyers are growing more particular as to inspecting shipments, probably for the reason that some purchases are not for immediate use and production is not handicapped by the rejection of cars. Prices are weak, and representative orders, in some cases only a day apart, are made at 25c. to 50c. below previous purchases. Heavy melting steel has been taken in small lots at $11.85 a gross ton, delivered. The Michigan Central and the New York Central are offering blank lists, and the Pennsylvania will sell 45,000 tons.

Prices delivered consumers' yards, Chicago:

Per Gross Ton	
Basic Open-Hearth Grades:	
Heavy melting steel	$11.50 to $12.00
Shoveling steel	11.50 to 12.00
Frogs, switches and guards, cut apart, and miscellaneous rails	12.75 to 13.25
Hydraulic compressed sheets	10.00 to 10.50
Drop forge flashings	9.00 to 9.50
Forged, cast and rolled steel car-wheels	14.25 to 14.75
Railroad tires, charging box size	14.25 to 14.75
Railroad leaf springs, cut apart	14.25 to 14.75
Acid Open-Hearth Grades:	
Steel couplers and knuckles	13.00 to 13.50
Coil springs	14.75 to 15.25
Low phosphorus punchings	13.25 to 13.75
Electric Furnace Grades:	
Axle turnings	11.50 to 12.00
Blast Furnace Grades:	
Axle turnings	10.50 to 11.00
Cast iron borings	10.00 to 10.50
Short shoveling turnings	10.00 to 10.50
Machine shop turnings	7.00 to 7.50
Rolling Mill Grades:	
Iron rails	13.00 to 13.50
Rerolling rails	14.25 to 14.75
Cupola Grades:	
Steel rails less than 3 ft	14.50 to 15.00
Angle bars, steel	13.25 to 13.75
Cast iron carwheels	13.25 to 13.75
Malleable Grades:	
Railroad	12.75 to 13.25
Agricultural	12.50 to 13.00
Miscellaneous:	
*Relaying rails, 56 to 60 lb.	23.00 to 25.00
*Relaying rails, 65 lb. and heavier	26.00 to 31.00
Per Net Ton	
Rolling Mill Grades:	
Iron angle and splice bars	13.50 to 14.00
Iron arch bars and transoms	18.00 to 18.50
Iron car axles	20.00 to 20.50
Steel car axles	15.00 to 15.50
No. 1 railroad wrought	9.75 to 10.25
No. 2 railroad wrought	10.00 to 10.50
No. 1 busheling	8.50 to 9.00
No. 2 busheling	4.50 to 5.00
Locomotive tires, smooth	12.50 to 13.00
Pipes and flues	7.50 to 8.00
Cupola Grades:	
No. 1 machinery cast	13.50 to 14.00
No. 1 railroad cast	12.50 to 13.00
No. 1 agricultural cast	12.50 to 13.00
Stove plate	11.75 to 12.25
Grate bars	10.75 to 11.25
Brake shoes	10.25 to 10.75

*Relaying rails, including angle bars to match, are quoted f.o.b. dealers' yards.

Warehouse Prices, f.o.b. Chicago

	Base per Lb.
Plates and structural shapes	3.10c.
Soft steel bars	3.00c.
Reinforcing bars, billet steel	2.20c. to 2.65c.
Cold-finished steel bars and shafting—	
Rounds and hexagons	3.60c.
Flats and squares	4.10c.
Bands	3.65c.
Hoops	4.15c.
Black sheets (No. 24)	3.95c.
Galvanized sheets (No. 24)	4.80c.
Blue annealed sheets (No. 10)	3.50c.
Spikes, standard railroad	3.55c.
Track bolts	4.55c.
Rivets, structural	3.60c.
Rivets, boiler	3.60c.
	Per Cent Off List
Machine bolts	60
Carriage bolts	60
Coach or lag screws	60
Hot-pressed nuts, squares, tapped or blank	60
Hot-pressed nuts, hexagons, tapped or blank	60
No. 8 black annealed wire, per 100 lb	$3.20
Common wire nails, base per keg	$2.85 to 2.95
Cement coated nails, base per keg	2.95

New York

Steel Price Concessions Recalled—Large Inquiries for Cast Pipe

NEW YORK, Nov. 1.—Inquiries for pig iron are more numerous, although not individually large, and consumers are taking more interest in their first quarter requirements. Sales by local brokers during the past week totaled 6000 tons, and a fair amount of tonnage is pending, although the largest single inquiry is for 500 tons. The largest individual sale of the week was 1000 tons of eastern Pennsylvania foundry iron for first quarter. Other purchases were mainly for early shipment. Melters are gradually using up pig iron due them on holdover contracts and are reaching a position where they must consider new buying, if only for their immediate needs. Eastern Pennsylvania foundry iron is still available at $19 to $19.50, base furnace, while Buffalo foundry ranges from $16 to $17, base furnace. Barge companies operating on the State barge canal, which are now rushed with grain traffic, have advanced the rate on pig iron to New York harbor from Buffalo to $3 a ton, or $1 above the lowest rate of the year. The new rate has virtually stopped the sale of iron for water shipment, because it makes the delivered price so high, after insurance, unloading charges and rail freight have been added, that there is little saving and in some cases an actual loss as compared with the delivered price on iron shipped all-rail. At the same time the season of navigation is fast drawing to a close. The Troy, N. Y., furnace was blown out last week. Plans for the blowing in of a Port Henry, N. Y., furnace are still indefinite.

Prices per gross ton, delivered New York district:

Buffalo No. 2 fdy., sil. 1.75 to 2.25 (all rail)	$20.91 to $21.91
No. 2 plain fdy. (by barge, del'd alongside in lighterage limits N. Y. and Brooklyn)	19.00 to 20.00
East. Pa. No. 2 fdy., sil. 1.75 to 2.25	20.39 to 21.52
East. Pa. No. 2 fdy., sil. 2.25 to 2.75	20.89 to 22.02
East. Pa. No. 1X fdy., sil. 2.75 to 3.25	21.39 to 22.52

Freight rates: $4.91 from Buffalo, $1.39 to $2.52 from eastern Pennsylvania.

Ferroalloys.—New business in both ferromanganese and spiegeleisen is confined to carload and small lots, but these are few and far between. One British representative of a maker of spiegeleisen has sold 50 tons for delivery this year. Prices are unchanged and there is yet no quotation available for contracts for next year for either alloy. Specifications on contract for all major ferroalloys are quite satisfactory.

Finished Steel.—Steel prices remain at practically the same levels as a week ago, but there are strong intimations in the trade that some of the larger producers will withdraw some of the special price concessions which have been granted to so-called preferred buyers. In certain instances these concessions have amounted to $2 or $3 a ton. This move would place plates, shapes and bars on a firm basis of 1.75c., Pittsburgh, for the most attractive tonnage and would leave open the question, frequently discussed of late, of exacting quantity extras for small lots, a step that may take the form soon of a new card of extras on the heavier hot-rolled products, following lines which have been successfully carried out by cold rolled strip steel manufacturers. As the price situation stands this week, 1.75c., Pittsburgh, is the usual price on plates, shapes and bars, and any deviations from this are declared to be the aftermath of old commitments. The price situation on sheets is still unsettled, but the quotations appearing during the week on ordinary tonnage are 2.10c. on blue annealed, 2.80c. on black and 3.65c. on galvanized, Pittsburgh base. Wire products are also weak, with sales of nails at $2.50 per 100-lb. keg and plain wire at 2.35c. per lb., Pittsburgh. Cold rolled strip steel prices on the new basis are being well maintained, but there are concessions on hot rolled strip, particularly the wide sizes. November starts out with no discernible prospect of an upturn in the volume of business in the remaining two months of the year. A falling off in inquiry for structural steel projects is noticeable, but is to be expected at this time of year, when orders now would mean deliveries in the winter months. Although steel business as a whole was perhaps a little better in October than in September, some companies represented in this district did less business in the past month than in the one preceding.

Mill prices per lb., delivered New York: Soft steel bars, 2.09c.; plates, 2.09c.; structural shapes, 2.09c.; bar iron, 2.09c. to 2.14c.

Cast Iron Pipe.—There is a considerable increase in activity, with several large tonnages of gas and water pipe under consideration. Prices, however, continue low, with $27 per net ton, base Birmingham, and less quoted on desirable business. Among current inquiries are several large lots, ranging up to 10,000 tons, one

Warehouse Prices, f.o.b. New York

	Base per Lb.
Plates and structural shapes	3.34c.
Soft steel bars and small shapes	3.24c.
Iron bars	3.24c.
Iron bars, Swedish charcoal	7.00c. to 7.25c.
Cold-finished shafting and screw stock—	
Rounds and hexagons	3.30c.
Flats and squares	3.80c.
Cold-rolled strip, soft and quarter hard,	6.00c. to 6.25c.
Hoops	4.49c.
Bands	3.99c.
Blue annealed sheets (No. 10 gage),	3.84c. to 3.89c.
Long terne sheets (No. 24 gage)	5.80c.
Standard tool steel	12.00c.
Wire, black annealed	4.50c.
Wire, galvanized annealed	5.15c.
Tire steel, 1½ x ½ in. and larger	3.30c.
Smooth finish, 1 to 2½ x ¼ in. and larger	3.65c.
Open-hearth spring steel, bases	4.50c. to 7.00c.
Machine bolts, cut thread:	Per Cent Off List
¾ x 6 in. and smaller	55 to 60
1 x 30 in. and smaller	50 to 50 and 10
Carriage bolts, cut thread:	
½ x 6 in. and smaller	55 to 60
¾ x 20 in. and smaller	50 to 50 and 10
Coach screws:	
½ x 6 in. and smaller	55 to 60
1 x 16 in. and smaller	50 to 50 and 10
Boiler Tubes—	Per 100 Ft.
Lap welded steel, 2-in.	$17.33
Seamless steel, 2-in.	20.24
Charcoal iron, 2-in.	25.00
Charcoal iron, 4-in.	67.00

Discounts on Welded Pipe

Standard Steel—	Black	Galv.
½-in. butt	46	29
¾-in. butt	51	37
1-in. butt	53	39
2½-6-in. lap	48	35
7 and 8-in. lap	44	17
11 and 12-in. lap	37	12
Wrought Iron—		
½-in. butt	5	+19
¾-in. butt	11	+ 9
1-1½-in. butt	14	+ 6
2-in. lap	5	+14
3-6-in. lap	11	+ 6
7-12-in. lap	3	+16

Tin Plate (14 x 20 in.)

	Prime	Seconds
Coke, 100 lb. base box	$6.45	$6.20
Charcoal, per box—	A	AAA
IC	$9.70	$12.10
IX	12.00	14.25
IXX	13.90	16.00

Terne Plate (14 x 20 in.)

IC—20-lb. coating	$10.00 to $11.00
IC—30-lb. coating	12.00 to 13.00
IC—40-lb. coating	13.75 to 14.25

Sheets, Box Annealed—Black, C. R. One Pass

	Per Lb.
Nos. 18 to 20	3.90c. to 4.00c.
No. 22	4.05c. to 4.15c.
No. 24	4.10c. to 4.20c.
No. 26	4.20c. to 4.30c.
No. 28*	4.35c. to 4.45c.
No. 30	4.60c. to 4.70c.

Sheets, Galvanized

	Per Lb.
No. 14	4.35c.
No. 16	4.45c.
No. 18	4.50c. to 4.60c.
No. 20	4.65c. to 4.75c.
No. 22	4.70c. to 4.80c.
No. 24	4.85c. to 4.95c.
No. 26	5.10c. to 5.20c.
No. 28*	5.35c. to 5.45c.
No. 30	5.75c. to 5.85c.

*No. 28 and lighter, 36 in. wide, 20c. higher per 100 lb.

of them calling for about 2500 tons of 20-in. for a private company in New Jersey. The Long Island Lighting Co. is in the market for about 4000 tons of 4-in., 6-in., 8-in. and 12-in. gas pipe, and the Community Water Service Co., 42 Cedar Street, New York, is asking for about 3500 tons of water pipe. A private water company that buys in New York is preparing an inquiry for about 15,000 tons of water pipe. The Brooklyn Union Gas Co., Brooklyn, N. Y., is reported to have closed for about 7500 tons of gas pipe with R. D. Wood & Co. Marshfield, Mass., has awarded 1500 tons of 6 to 14-in. water pipe to the United States Cast Iron Pipe & Foundry Co., which will furnish centrifugal pipe. An option for the purchase of 2500 tons additional within the next seven months was also obtained. The low bid on the 2500 tons of 36-in. water pipe for Albany, N. Y., was submitted by B. Nicoll & Co.

Prices per net ton, delivered New York: Water pipe 6-in. and larger, $36.25 to $37.25; 4-in. and 5-in., $41.25 to $42.25; 3-in., $51.25 to $52.25; Class A and gas pipe, $4 to $5 extra.

Coke.—Inquiries and sales are confined to carload lots of foundry grade. With the market still quiet, prices are unchanged at $2.75 to $3.25 per net ton, Connellsville, for furnace coke and $4 to $4.25 for standard foundry. Delivered prices on Connellsville foundry coke are: To northern New Jersey, $8.03 to $8.28; to New York or Brooklyn, $8.79 to $9.04; to Newark or Jersey City, N. J., $7.91 to $8.16. By-product coke continues at $9.46 per net ton for West Virginia coke to $9.59 and $10.77 per net ton for the local product, delivered Newark or Jersey City, N. J.

Warehouse Business.—October was a decidedly better month for most jobbers and in a few instances represented the best total business in any month this year. Prices of black, galvanized and blue annealed sheets continue to show softness, particularly the quotations on galvanized. Concessions range up to 10c. per 100 lb. on black and galvanized and are slightly smaller on blue annealed. The new quantity extras on cold-rolled shafting and screw stock are in effect, and the base price has been reduced to 3.30c. per lb. for rounds and hexagons and 3.80c. for flats and squares. On the new list there is also a minimum item charge of 25c. per item and a minimum invoice charge of 50c. The new size extras on hexagon bars are from 5c. to 20c. lower than on the former list.

Reinforcing Bars.—The market his been unusually quiet in the last week, with no jobs of importance reported closed. General contracts have been let on the floor decks for two bridges connecting Staten Island with New Jersey, and the 1800 tons of bars required will probably be purchased this month. Bids were thrown out on a highway viaduct in Newark, requiring about 800 tons of bars, and new figures will be received about the middle of the month. Distributers in this territory are quoting 2.80c. per lb. for lots of 5 tons or more, delivered at job out of New York warehouse; on lots of 2 to 5 tons the price is 2.95c., and for less than 2 tons, 3.24c. The quoted mill price is still 1.85c., Pittsburgh, and the Youngstown warehouse price is unchanged at 2.20c., or 2.57½c., f.o.b. car at New York.

Old Material.—Buying prices of most grades still show a downward trend in a quiet market. No. 1 heavy melting steel is unchanged at $13.50 per ton, delivered. Yard grade is being purchased at $10.50 to $10.75 per ton, delivered to Pottsville or Phoenixville, Pa. A broker filling a contract for heavy breakable cast for delivery to a Florence, N. J., consumer has reduced his buying price 50c. per ton. Steel mill stove plate is quoted at $12 to $12.50 per ton, delivered. Iron car axles have been purchased by a Lebanon, Pa., consumer at $30 per ton and by a Scranton, Pa., user at $28.50 per ton, delivered. Machine shop turnings are being purchased at $10 per ton, delivered to Phoenixville or Harrisburg, Pa. Borings and turnings are unchanged at $10 per ton, delivered. There is a fair tonnage of scrap in railroad lists opening this week. The Pennsylvania Railroad offers about 40,000 tons, the Baltimore & Ohio about 30,000 tons, and the New York Central 15,000 tons. Offerings of scrap by the Erie, Lehigh Valley and Delaware, Lackawanna & Western are expected in a few days.

Dealers' buying prices per gross ton, New York:

No. 1 heavy melting steel	$10.00 to $10.85
Heavy melting steel (yard)	6.75 to 7.25
No. 1 heavy breakable cast	11.50 to 12.00
Stove plate (steel works)	8.50 to 9.00
Locomotive grate bars	8.75 to 9.00
Machine shop turnings	6.25 to 6.50
Short shoveling turnings	6.50 to 7.25
Cast borings (blast furnace or steel works)	7.00 to 7.50
Mixed borings and turnings	6.50 to 7.50
Steel car axles	16.75 to 17.25
Iron car axles	23.50 to 24.50
Iron and steel pipe (1 in. diam., not under 2 ft. long)	8.75
Forge fire	6.50 to 6.75
No. 1 railroad wrought	10.50 to 11.00
No. 1 yard wrought, long	9.00 to 9.50
Rails for rolling	10.25 to 10.75
Cast iron carwheels	11.25 to 11.75
Stove plate (foundry)	9.00 to 9.50
Malleable cast (railroad)	10.00 to 10.50
Cast borings (chemical)	11.50 to 12.00

Prices per gross ton, delivered local foundries:

No. 1 machinery cast	$14.00 to $14.50
No. 1 heavy cast (columns, building materials, etc.), cupola size	12.50 to 13.00
No. 2 cast (radiators, cast boilers, etc.)	11.50 to 12.00

Cleveland

Bids Opened on 18,000-Ton Bridge—New Size Extras on Hexagon Bars

CLEVELAND, Nov. 1.—The steel market in the past week has shown very few signs of improvement. October business with some of the mills in this territory fell considerably below the September volume. In the automobile field a General Motors Corporation unit has placed a fair tonnage for the Chevrolet, Pontiac and Oakland cars for shipment starting Nov. 15, but so far has not released much tonnage against these orders. Although the Ford Motor Co. is making a few cars to try out its assembly line, it has not yet come into the market for steel to enable it to go on a production basis. Operations of metal-working plants in this territory show no increase, and these are buying steel in very small lots.

In the structural field the Cleveland Union Terminals Co. opened bids Monday for the Cuyahoga River bridge, requiring 18,200 tons. General contracts have been placed in Akron, Ohio, for a post office and hospital requiring 1000 tons. The General Motors Corporation is reported to have placed 2500 tons for an addition to its Oldsmobile plant at Lansing, Mich. Very little new structural inquiry is coming out.

Weakness is reported in some sections on plates, buyers asserting that they have been quoted 1.70c., Pittsburgh, and even lower. The Biggs Boiler Works Co., Akron, was low bidder for a pipe line in New Jersey requiring 3000 tons of plates. Plate mills catering to small-lot consumers report that their sales in this territory fell off last month. Steel bars and structural material are firm at 1.75c., Pittsburgh. The local mill price on steel bars is steady at 1.75c., Cleveland.

New size extras making reductions to apply only to large users have been adopted on hot-rolled hexagon steel bars in sizes from ⅜ in. to 1 9/16 in. On ⅝ in. to 1 9/16 in. the reduction is 50 per cent, or $4 a ton on ⅝ in. to 11/16 in. and $2.50 a ton on ¾ in. to 1 9/16

Warehouse Prices, f.o.b. Cleveland

	Base per Lb.
Plates and structural shapes	3.00c.
Soft steel bars	3.00c.
Reinforcing steel bars	2.25c. to 2.75c.
Cold-finished rounds and hexagons	3.65c.
Cold-finished flats and squares	4.15c.
Hoops and bands	3.65c.
Cold-finished strip	*5.95c.
Black sheets (No. 24)	3.75c.
Galvanized sheets (No. 24)	4.40c. to 4.50c.
Blue annealed sheets (No. 10)	3.25c.
No. 9 annealed wire, per 100 lb.	$2.90
No. 9 galvanized wire, per 100 lb.	3.35
Common wire nails, base per keg	2.90

*Net base, including boxing and cutting to length.

in. Sizes ½ in. to 9/16 in. are reduced $5 per ton; 7/16 in. $4 per ton, and ⅜ in. $2 per ton.

Pig Iron.—The market continues to drag, with buying confined to small lots to fill out for the remainder of the year. Cleveland interests sold 12,000 tons during the week, or about the same as during the previous week. The present low prices are not arousing interest among consumers in first quarter contracts. Southern foundry iron has declined $1.25 a ton to $16, Birmingham. While the effect of this reduction will be largely sentimental in this territory, the lower price may cause some consumers in southern Ohio and Indiana to use more Southern iron in their mixtures and in that way affect some of the Lake furnaces that sell iron in those territories. Cleveland producers continue to quote foundry and malleable iron at $17, furnace, for outside shipment and are taking some business at that price, although it is evidently being shaded on iron for shipment to some competitive points, and regular silicon differentials are not being adhered to. The price reduction to $18, furnace, for Cleveland delivery has not stimulated local sales. Another cargo of Cleveland iron was shipped by water to Chicago late last week, making five or six cargoes shipped to a broker in that city during the present season. Some producers shipped more iron in October than in September, and others less, the total being about the same as during the previous month. Foundry operations show no increase, and some consumers are holding back on shipments.

Prices per gross ton at Cleveland:

N'th'n No. 2 fdy., sil. 1.75 to 2.25	$18.50
Southern fdy., sil. 1.75 to 2.25	22.00
Malleable	18.50
Ohio silvery, 8 per cent	30.00
Basic, Valley furnace	17.00
Standard low phos., Valley furnace	27.00

Prices, except on basic and low phosphorus, are delivered Cleveland. Freight rates: 50c. from local furnaces; $3 from Jackson, Ohio; $6 from Birmingham.

Semi-Finished Steel.—Specifications for sheet bars continue rather light, and little new business is coming out. Recent quotations seem to be well maintained. Wire rods range from $40 to $42, Cleveland.

Iron Ore.—Water shipments of Lake Superior ore during October amounted to 6,722,757 tons, a falling off of 2,615,017 tons from October, last year, or 28 per cent. The movement until Nov. 1 was 49,110,133 tons, a decrease of 5,458,549 tons as compared with the corresponding period last year, or 10 per cent.

Sheets.—Inquiry picked up somewhat during the week, mostly for blue annealed sheets from stamping companies engaged in automobile work, but sales were light. Competition is keen, and the market is weak. However, prices seem to be holding to the minimum quotations that appeared during the previous week. Black sheets range from 2.75c. to 2.90c., Pittsburgh. On blue annealed the usual range is 2.10c. to 2.15c., Pittsburgh, but this grade is very irregular and the lower price is being shaded $1 or more per ton. On galvanized sheets some of the mills are quoting 3.65c., Pittsburgh, and 3.75c., Ohio mill.

Strip Steel.—Cold-rolled strip steel is moving slightly better than recently, owing to the release of some tonnage by the automotive industry. The market appears firm at 2.90c., Cleveland, for lots of 3 tons or over, with some mills still asking 3c. Hot-rolled strip in wide material is irregular, with quotations of 1.90c., Pittsburgh, rather common, although small lots in some cases are bringing 2c.

Reinforcing Bars.—New inquiry is light. The E. H. Lathrop Co., Columbus, Ohio, was low bidder for the Dayton, Ohio, sewage disposal plant, requiring 2300 tons. Prices on rail steel are unchanged at 1.60c. to 1.75c., mill.

Warehouse Business.—Some of the jobbers have reduced galvanized sheets $3 a ton to 3.50c. per lb. Other warehouse prices are fairly firm. Warehouse business continues rather slow. The October volume was about the same as that during September.

Coke.—There is little demand for foundry coke, and prices are unchanged at $4 to $5.35, ovens, for Connellsville grades, the maximum being for one premium brand. There is some activity in foundry heating coke, which ranges from $2.75 to $3, ovens, for prompt shipment. By-product coke for domestic use is moving very slowly.

Bolts, Nuts, and Rivets.—The demand for bolts and nuts is confined to small lots, and October business showed only slight gain over September. The industry is not operating at over 50 to 60 per cent of capacity. Prices are being well maintained. Rivet orders show no gain, and some makers took less business in October than in September.

Old Material.—There is no new demand from consumers, and shipments are restricted. However, with the curtailed output, consumers appear to be taking about as much scrap as is produced. There is a limited demand in the Valley district for No. 1 heavy melting steel and compressed sheet steel, and dealers are paying $14.50 for the former and $14 for the latter. The Buick Motor Co., Flint, Mich., closed Oct. 27 on a list of 6500 tons. Most of the November lists of other automobile companies which are now out are smaller than usual, reflecting the slowing down in the automotive industry. Prices show no change, but are largely nominal.

Prices per gross ton, delivered consumers' yards:

Basic Open-Hearth Grades	
No. 1 heavy melting steel	$13.50 to $13.75
No. 2 heavy melting steel	13.00 to 13.25
Compressed sheet steel	12.50 to 12.75
Light bundled sheet stampings	11.00 to 11.50
Drop forge flashings	12.00 to 12.50
Machine shop turnings	9.00 to 9.25
No. 1 railroad wrought	11.50 to 12.00
No. 2 railroad wrought	13.50 to 13.75
No. 1 busheling	11.50 to 11.75
Pipes and flues	9.00 to 9.50
Steel axle turnings	12.50 to 13.00
Acid Open-Hearth Grades	
Low phosphorus forging crops	16.50 to 17.00
Low phosphorus, billet, bloom and slab crops	17.00 to 17.50
Low phosphorus sheet bar crops	16.00 to 16.50
Low phosphorus plate scrap	16.00 to 16.50
Blast Furnace Grades	
Cast iron borings	10.50 to 10.75
Mixed borings and short turnings	10.50 to 10.75
No. 2 busheling	10.50 to 10.75
Cupola Grades	
No. 1 cast	16.50 to 17.00
Railroad grate bars	12.00 to 12.50
Stove plate	12.00 to 12.50
Rails under 3 ft.	18.00 to 18.50
Miscellaneous	
Railroad malleable	15.50 to 16.00
Rails for rolling	16.25 to 16.50

Philadelphia

Navy Department Buys Over 4000 Tons of Steel—Market Generally Dull

PHILADELPHIA, Nov. 1.—The local steel trade cannot point to any improvement in the volume of business in October, nor is there any apparent prospect that the situation will change greatly one way or the other in the remaining two months of the year. The price situation on the heavier products is somewhat more stable.

Warehouse Prices, f.o.b. Philadelphia

	Base per Lb.
Plates, ¼-in. and heavier	2.60c. to 2.80c.
Plates, ⅛-in.	2.80c. to 3.00c.
Structural shapes	2.50c. to 2.80c.
Soft steel bars, small shapes and iron bars (except bands)	2.50c. to 2.80c.
Round-edge iron	3.50c.
Round-edge steel, iron finished, 1½ x 1½ in.	3.50c.
Round-edge steel, planished	4.30c.
Reinforcing steel bars, square, twisted and deformed	2.50c. to 3.00c.
Cold-finished steel, rounds and hexagons	3.25c. to 5.25c.
Cold-finished steel squares and flats	3.75c. to 5.75c.
Steel hoops	3.85c. to 4.15c.
Steel bands, No. 12 gage to ⅛-in., inclusive	3.60c. to 3.90c.
Spring steel	5.00c.
Black sheets (No. 24)	4.25c. to 4.35c.
Galvanized sheets (No. 24)	5.10c. to 5.20c.
Blue annealed sheets (No. 10)	3.20c. to 3.30c.
Diamond pattern floor plates—	
¼-in.	5.30c.
⅛-in.	5.50c.
Rails	3.20c.
Swedish iron bars	6.60c.

but to offset this the sheet situation continues weak and buying is in restricted quantity. The pig iron and scrap markets are exceedingly dull, with price weakness.

Pig Iron.—Except for purchases of 1000 tons of foundry iron by the J. L. Mott Iron Works, Trenton, N. J., and 500 tons of malleable and about 200 tons of silvery iron by the Pusey & Jones Co., Wilmington, Del., the local pig iron market has been lacking in business larger than carload lots. In view of the low rate at which most of the foundries are operating, the outlook for the remainder of the year is not encouraging. A good deal of first quarter iron is still to be purchased, but melters seem in no hurry to anticipate their needs. Eastern Pennsylvania foundry iron is being sold at $19 to $19.50, furnace, for the base grade.

Prices per gross ton at Philadelphia:

East. Pa. No. 2 plain, 1.75 to 2.25 sil.	$19.76 to $20.26
East. Pa. No. 2X, 2.25 to 2.75 sil.	20.26 to 20.76
East. Pa. No. 1X	20.76 to 21.26
Basic (delivered eastern Pa.)	20.00
Gray forge	19.50 to 20.00
Malleable	21.00 to 21.50
Standard low phos. (f.o.b. New York State furnace)	23.00 to 24.00
Copper bearing low phos. (f.o.b. furnace)	23.50 to 24.00
Virginia No. 2 plain, 1.75 to 2.25 sil.	25.29 to 25.54
Virginia No. 2X, 2.25 to 2.75 sil.	25.79 to 26.04

Prices, except on low phosphorus, are delivered Philadelphia. Freight rates: 76c. to $1.64 from eastern Pennsylvania furnaces; $4.54 from Virginia furnaces.

Plates.—Stabilization of the plate price is more nearly a reality than it has been at any time in months. Regardless of the tonnage inquired for, quotations are said to be firm at 1.75c., Pittsburgh, with all makers. Most of the orders are small and do not afford any real test of the price. The Navy Department has awarded orders for 3600 tons of medium steel plates for cruisers Nos. 28 and 29 to the Worth Steel Co. and 300 tons of high tensile steel to the Bethlehem Steel Co. The Alan Wood Iron & Steel Co. will furnish 150 tons of blue annealed sheets. One ship will be built at Puget Sound and the other at Mare Island.

Structural Shapes.—In the opinion of the steel trade, progress is being made toward putting the price of shapes on a firm basis of 1.75c., Pittsburgh, so far as new business is concerned. But the situation is complicated by the fact that practically all of the important buyers are protected at lower prices, in some instances until the end of the year. Inquiries for fabricated steel work are at a low point in this district, and the awards in the past week have been few and of small tonnage.

Bars.—Orders for steel bars are usually in lots of not more than a carload, and the aggregate booked in October by local sales offices was little, if any, above that of September. The price of 1.75c., Pittsburgh, seems to be firm for all classes of buyers. Even the largest consumers are continuing to place their orders in driblets and the subject of price is secondary to that of time of delivery. A mill that can ship in the same week in which an order is received is likely to be favored with the order.

Sheets.—Prices are still subject to pressure. For ordinary lots the usual quotations are 2.10c. for blue annealed, 2.80c. for black and 3.65c. for galvanized, Pittsburgh base.

Warehouse Business.—Competition among local jobbers continues very keen, with prices in many instances being cut to narrow margins.

Imports.—Last week's imports of finished steel were 782 tons, of which 642 tons of structural shapes came from Belgium, 93 tons of bars from Belgium and 47 tons of bars from France. Manganese ore from British India amounted to 1500 tons.

Old Material.—With the supply of nearly all grades of scrap exceeding the demand, prices are again giving way. The grades which are weaker are bundled sheets, machine shop turnings, grate bars, stove plate and cast iron borings. One mill is taking heavy melting steel at $14, delivered, but other consumers seem to be well supplied. Decreasing consumption of scrap at the Sparrows Point plant of the Bethlehem Steel Co., due to increase of Bessemer steel capacity there, is forcing heavy melting steel from the vicinity of Baltimore into the Philadelphia market, which adds to the available supply.

Prices per gross ton delivered consumers' yards, Philadelphia district:

No. 1 heavy melting steel	$14.00
Scrap T rails	$13.00 to 13.50
No. 2 heavy melting steel	11.00 to 11.50
No. 1 railroad wrought	15.50 to 16.00
Bundled sheets (for steel works)	10.50
Machine shop turnings (for steel works)	10.50
Heavy axle turnings (or equivalent)	12.00 to 12.50
Cast borings (for steel works and rolling mill)	11.25 to 11.50
Heavy breakable cast (for steel works)	16.00
Railroad grate bars	12.50
Stove plate (for steel works)	12.50
No. 1 low phos., heavy, 0.04 per cent and under	18.00 to 18.50
Couplers and knuckles	16.00 to 16.50
Rolled steel wheels	15.50 to 16.00
No. 1 blast furnace scrap	10.50
Machine shop turnings (for rolling mill)	11.00 to 11.50
Wrought iron and soft steel pipes and tubes (new specifications)	12.50 to 13.00
Shafting	17.50 to 18.00
Steel axles	19.00 to 20.00
No. 1 forge fire	11.00
Steel rails for rolling	16.00
Cast iron carwheels	15.50 to 16.00
No. 1 cast	16.50 to 17.00
Cast borings (for chemical plant)	15.00 to 15.50

Developments in Making Wrought Iron by Aston Process

Frequent references lately that the activities of the A. M. Byers Co. at the plant of the American Puddled Iron Corporation, Warren, Ohio, under lease to the Byers company, had to do with the development of a mechanical puddling process, are so wide of the mark as to call for explanation and correction.

Puddling suggests the working of a mass of molten iron in a furnace and the employment of a long bar in the hands of a puddler or as part of a machine to bring about a proper mixture of metal and slag. No such operation is to be seen at the Warren plant, where the company is giving the Aston process an exhaustive trial. As is well known, since James Aston, inventor of the process, told the story of it at the fall meeting of the American Iron and Steel Institute in 1925, the process is not mechanical puddling but rather a method of independently refining the base metal and then effecting disintegration of this metal and incorporation of the slag to produce wrought iron.

The base metal is refined to a degree conforming to commercially pure iron characteristics in a Bessemer converter. This molten metal is poured from a ladle into a thimble containing molten slag of puddling characteristics. Without application of either manual or mechanical working of the mass, the metal is disintegrated into a sponge, impregnated with molten slag. The resultant ball or sponge is pressed to a rectangular bloom, and rolled to billet or bar sections.

In addition to the refining accomplished in the converter, the entry of the metal into the slag is said to secure a high degree of super refining. In addition, the dominant characteristic of wrought iron, namely, the uniform and fine dissemination of slag throughout the product, is effected.

Intricate Castings Made Centrifugally

Great interest has been aroused among British engineers in the development of the rotary or, as it has come to be known, the centrifugal method of producing cast iron and other metal and alloy castings. Of late, however, not so much has been heard of the process because its usefulness is generally recognized and its limitations are known. The latest development of the Hurst-Ball centrifugal process enables fairly intricate castings to be produced with ports, waterways, bosses and flanges. The metal used is a low-silicon cast iron, and the resultant castings have an exceptionally fine-grained structure.

Birmingham

Pig Iron Drops $1.25 to $16 Base—Steel Buying Improves

BIRMINGHAM, Nov. 1.—After holding firm to a base of $17.25 for several months in spite of a very poor market and steady pressure from the larger melters, Birmingham producers of pig iron have reduced their prices to $16. This quotation is being offered, however, only on November and December shipments, and sales are not being made at this price for first quarter deliveries. This is the lowest price on Birmingham iron since March, 1922, when the market ranged from $15 to $15.50. Following the reduction an intensive solicitation of the trade was made. A very fair tonnage was booked by the end of the week, and the present one is expected to bring in considerably more. Before the cut, Birmingham furnaces were faced with the probability of entering November with a comparatively small backlog. Nine furnaces are still in blast on foundry iron. The total number of active furnaces in the State, however, was reduced to 18 on Oct. 16 when Bessemer No. 2 of the Tennessee Coal, Iron & Railroad Co. was blown out for relining. This furnace had been making ferromanganese since last January. The Tennessee company is now operating only seven blast furnaces out of 12, the fewest in a long time.

Prices per gross ton, f.o.b. Birmingham district furnaces:

No. 2 foundry, 1.75 to 2.25 sil.	$16.00
No. 1 foundry, 2.25 to 2.75 sil.	16.50
Basic	16.00

Finished Steel.—The outlook is much better than at the beginning of October. There has been a gradual accumulation of orders and a steady growth in the volume of inquiries. Structural steel fabricators and reinforcing bar distributers have secured some good tonnage lately, mostly in small lots. Open-hearth furnace operations have remained at virtually the same level for several weeks, the Tennessee Coal, Iron & Railroad Co. operating 12 of its 17 furnaces and the Gulf States Steel Co. five of its six. The Gulf States Steel Co. may take one off during the present week. Galvanized sheets have declined, now ranging from 3.95c. to 4c., Birmingham.

Cast Iron Pipe.—Pressure and soil pipe plants, both in Birmingham and Anniston, Ala., report that conditions are unchanged. Operations are at the same level as for weeks past, with pressure pipe plants running at around 75 per cent of capacity and soil pipe plants on a four or five-day schedule. Some of the soil pipe plants in the State have been shut down. Pressure pipe plants are producing against old contracts and small orders. There was no new business of any consequence last week. Prices are weak at $28 to $30 per net ton, Birmingham, for 6-in. and larger diameters.

Coke.—Since the middle of October there has been a very evident slowing up in sales and shipments. Contract coke is not moving as freely as heretofore, and new tonnage is accumulating slowly. The drop in pig iron prices has not yet affected coke quotations, and Birmingham producers and sales agencies continue to ask $5.50, ovens, on contract and $6 for spot coke. Most of the coke requirements for the quarter have already been placed.

Old Material.—Demand continues light. Regular customers are taking shipments of certain grades as usual, but the volume is not large. Prices are stationary.

Prices per gross ton, delivered Birmingham district consumers' yards:

Heavy melting steel	$10.00 to $10.50
Scrap steel rails	11.00 to 11.50
Short shoveling turnings	8.00 to 8.50
Cast iron borings	8.00 to 8.50
Stove plate	13.00 to 14.00
Steel axles	19.00 to 20.00
Iron axles	18.00 to 20.00
No. 1 railroad wrought	10.00 to 11.00
Rails for rolling	12.00 to 13.00
No. 1 cast	15.00 to 16.00
Tramcar wheels	12.50 to 13.50
Cast iron carwheels	12.00 to 13.00
Cast iron borings, chemical	13.50 to 14.00

Toronto

Good Volume of Spot Demand for Pig Iron—Scrap Buying Is Heavier

TORONTO, ONT., Nov. 1.—With a third of the last quarter of the year passed, the Canadian pig iron market finds the majority of melters who show a preference for advance buying covered until the end of the year. Producers now rely on spot buying for new business, and at the moment it appears that buying of that character will hold at a high level for the next two months. Orders are more numerous, and tonnages involved in individual orders are also greater. Sales ranging from 50 to 200 tons are fairly common, and a few orders up to 500 tons have recently been booked. Scheduled deliveries are being made against contracts, with the result that the total shipments of iron run into large tonnages. Although mills at Sault Ste. Marie, Ont., and Sydney, N. S., curtailed operations during September owing to the completion of rail orders, new rail business has been taken and operations at these points will shortly be resumed on close to a capacity basis. The starting up of rail mills will mean the blowing in of additional blast furnaces at these points. United States competition in pig iron has been more keenly felt of late in the Montreal market, and Canadian producers have, in some instances, resorted to shading in order to meet it. Canadian prices as a whole, however, are unchanged.

Prices per gross ton:

Delivered Toronto	
No. 1 foundry, sil. 2.25 to 2.75	$23.60
No. 2 foundry, sil. 1.75 to 2.25	23.60
Malleable	23.60
Delivered Montreal	
No. 1 foundry, sil. 2.25 to 2.75	25.50
No. 2 foundry, sil. 1.75 to 2.25	25.50
Malleable	25.50
Basic	24.50
Imported Iron at Montreal Warehouse	
Summerlee	33.50
Carron	33.00

Old Material.—In the Toronto district, sales for the past week have been larger than for some time past, and it is the general belief of the trade that there will be a good demand until the end of the year at least. While much of the current demand in this market is from the Hamilton, Ont., district, there has been improvement in buying in other sections of the province. The present demand is not confined to any special line of scrap, but the greatest improvement in business centers in such lines as heavy melting steel, turnings and machinery cast. In the Montreal market business shows a general falling off. The reduction in prices announced last week failed to have a stimulating effect on business, but on the contrary appears to have further weakened the market. Following a decline in demand for local consumption, there has also been a falling off in export business. While some shipments are being made to buyers across the international boundary, they are by no means as extensive as a couple of months ago. Prices in the Toronto market are firm but unchanged, while those of the Montreal district are still on the weak side.

Dealers' buying prices:

	Toronto	Montreal
Per Gross Ton		
Heavy melting steel	$9.50	$8.00
Rails, scrap	10.00	10.00
No. 1 wrought	10.00	11.00
Machine shop turnings	7.00	6.00
Boiler plate	7.00	7.00
Heavy axle turnings	7.50	7.50
Cast borings	7.50	6.00
Steel turnings	7.00	6.50
Wrought pipe	5.00	6.00
Steel axles	14.00	19.00
Axles, wrought iron	16.00	21.00
No. 1 machinery cast	....	16.00
Stove plate	....	12.00
Standard carwheels	....	14.50
Malleable	....	13.00
Per Net Ton		
No. 1 machinery cast	15.00	....
Stove plate	9.00	....
Standard carwheels	13.00	....
Malleable scrap	13.00	....

San Francisco

Coke Prices Advance—Los Angeles to Buy 4100 Tons of Cast Pipe

SAN FRANCISCO, Oct. 29 (*By Air Mail*).—Following several weeks of activity in the plate and structural shape markets on the Coast, awards this week fell off, only two major lettings being reported. These included 400 tons of blue annealed sheets for a pipe line in Alaska for the United States Stores, placed with the Western Pipe & Steel Co., and 1200 tons of fabricated material for 12 railroad spans for the Manila Railway in the Philippine Islands, booked by the Atlantic, Gulf & Pacific Co.

Los Angeles building permits for the first 18 days of this month numbered 2360, with a total valuation of $6,800,948, as compared with 2003 permits with a valuation of $5,630,105 for the same period in the preceding month and 2098 permits with a value of $4,824,320 for the corresponding period in October, last year.

Pig Iron.—A survey made by one large dealer in foundry pig iron shows considerable activity in plants manufacturing sanitary ware, which offsets to some extent the low rate of operations of the majority of jobbing plants on the Coast. An importer has a shipment of Indian iron en route and due to arrive about the middle of the next month. About one-half of the cargo, amounting to 1100 tons, will be unloaded at San Pedro, Cal., and the remainder at San Francisco. The same dealer has two vessels chartered, one to load in November and the other in December, both of which will arrive in the early part of next year. Prices are unchanged.

Prices per gross ton at San Francisco:

*Utah basic	$25.00 to $26.00
*Utah foundry, sil. 2.75 to 3.25	25.00 to 26.00
**Indian foundry, sil. 2.75 to 3.25	25.00
**German foundry, sil. 2.75 to 3.25	24.25

*Delivered San Francisco.
**Duty paid, f.o.b. cars San Francisco.

Shapes.—Prices on plain structural material from domestic mills continue exceptionally firm at 2.40c. per lb., c.i.f. Coast ports. Foreign importers have quoted as low as 1.65c., c.i.f., duty paid, recently, and have booked some tonnage at this figure. Fabricating awards this week totaled about 1800 tons. In addition to the bridge material for the Manila Railway reported above, Dyer Brothers took 100 tons for a warehouse for the Crane Co. at San Francisco. Bids go in next week on 520 tons for berths at San Pedro, Cal. The award of steel for the Methodist Book Concern's 23-story hotel on McAllister Street, San Francisco, is expected to be made within the next two weeks. Several thousand tons are involved. Plans are being revised on a hospital at Eureka, Cal., that originally called for 140 tons of shapes. It is probable that this building will now be a redwood frame structure.

Plates and Sheets.—Awards of 400 tons of blue annealed sheets for a 4 to 18-in. pipe line in Alaska to the Western Pipe & Steel Co. and 100 tons for a 20-in. pontoon pipe line for the Port Commission at Oakland, Cal., to the Steel Tank & Pipe Co. were the only two bookings reported. No action has yet been taken by the Southern Pacific Co., San Francisco, on its inquiry for approximately 100 tons of plates. No new inquiries came up for figures during the week. Mill prices on plates are holding well to the 2.40c., c.i.f., level established some time ago.

Bars.—Mild steel bars are moving in small lots only, and the rolling schedules of Coast producers are limited to orders involving numerous sizes. Reinforcing bar awards this week totaled over 700 tons and included 220 tons for a hotel at Merced, Cal., placed with Badt-Falk Co., 200 tons for a pier shed in Oakland, Cal., taken by Frederick Steel Co., 100 tons for a hospital at Seattle, Wash., secured by the Pacific Coast Steel Co., and 100 tons for a high school at Walla Walla., Wash., awarded to the Northwest Steel Rolling Mills. Bids on several projects calling for over 100 tons each have been opened. Out-of-stock prices in the San Francisco district remain unchanged from those quoted last week, but apparently are not so firm as they were.

Cast Iron Pipe.—Outstanding among the lettings this week were two totaling 515 tons for San Bernardino, Cal. Awards were as follows:

SAN BERNARDINO, CAL., 293 tons, 8 and 12-in. Class 250, to American Cast Iron Pipe Co.

SAN BERNARDINO, CAL., 222 tons, 4 and 6-in. Class 250, to Pacific States Cast Iron Pipe Co.

BURLINGTON, ORE., 383 tons, 2, 4 and 6-in. Class B, to Keating & Bade.

SAN DIEGO, CAL., 195 tons, 6 to 16-in. Class B, improvement of Fifty-fourth Street, to T. B. Penick & Son.

SANTA MONICA, CAL., 183 tons 4 and 6-in. Class B, improvement of Twenty-third Street, to O. F. Fisher.

The second largest tonnage of the year is now before the trade for figures. This is 4163 tons of 6-in. Class B pipe for Los Angeles, bids on which will be opened Nov. 1. Other inquiries include 182 tons of 6 and 12-in. Class B pipe for Santa Barbara, Cal., bids to be opened Nov. 3; 142 tons of 6-in. Class B pipe for Phoenix, Ariz., up for bids on Nov. 2; 109 tons of 4-in. Class B pipe for the United States Indian service, Department of Interior, Ft. Duquesne, Utah, bids on which have been opened, and 100 tons of 4 and 6-in. Class B pipe for Rolando Park, Units 4 and 5, San Diego, Cal., bids on which have been received. Prices remain weak at $35 a ton, delivered, on 6-in. Class B and larger.

Steel Pipe.—The Grinnell Co. of the Pacific submitted the only bid on 60,000 ft. of 6-in. welded steel pipe, 570 tons, for the city of Los Angeles. Its figure was 55.85c. per foot.

Coke.—Coke prices have advanced slightly, English beehive having been advanced from $15 to $16 to $15 to $16.50 per net ton at incoming dock and English by-product material having been raised from $12 to $13 to $12.50 to $13.50 per net ton at incoming dock. Several shipments of foreign foundry coke are either en route or are now being loaded. No large inquiries were reported current this week.

Warehouse Prices, f.o.b. San Francisco

	Base per Lb.
Plates and structural shapes	3.15c.
Soft steel bars	3.15c.
Small angles, ⅞-in. and over	3.15c.
Small angles, under ⅞-in.	3.55c.
Small channels and tees, ¾-in. to 2¾-in.	3.75c.
Spring steel, ¼-in. and thicker	5.00c.
Black sheets (No. 24)	4.80c.
Blue annealed sheets (No. 10)	3.75c.
Galvanized sheets (No. 24)	5.35c.
Structural rivets, ½-in. and larger	5.65c.
Common wire nails, base per keg	$3.35
Cement coated nails, 100-lb. keg	3.35

Cincinnati

Sharp Reduction Puts Southern Pig Iron in Competitive Position

CINCINNATI, Nov. 1.—A reduction of $1.25 a ton in the price of Southern iron for November and December delivery is the outstanding development in the pig iron market. One Southern producer was the first to put its iron on a basis of $16, Birmingham, but others, including the only active furnace in Tennessee, rapidly followed. The desire to stimulate buying among

Warehouse Prices, f.o.b. Cincinnati

	Base per Lb.
Plates and structural shapes	3.40c.
Bars, soft steel or iron	3.30c.
Reinforcing bars	3.30c.
Hoops	4.00c. to 4.25c.
Bands	3.95c.
Cold-finished rounds and hexagons	3.85c.
Squares	4.35c.
Open-hearth spring steel	4.75c. to 5.00c.
Black sheets (No. 24)	4.05c.
Galvanized sheets (No. 24)	4.90c.
Blue annealed sheets (No. 10)	3.60c.
Structural rivets	3.85c.
Small rivets	65 per cent off list
No. 9 annealed wire, per 100 lb	$3.00
Common wire nails, base per keg	2.95
Cement coated nails, base 100 lb. keg	2.95
Chain, per 100 lb	7.55
	Net per 100 Ft.
Lap-welded steel boiler tubes, 2-in.	$18.00
4-in.	38.00
Seamless steel boiler tubes, 2-in.	19.00
4-in.	39.00

Southern consumers, notably the pipe companies, is said to have been the chief motive for the drop. Dealers are of the opinion that the realinement will not have much effect locally. At the new base the delivered price of Southern iron at Cincinnati is $19.69 a ton, whereas Lake Erie furnaces, selling iron at $16.50, base furnace, can make deliveries in this city at $19.40. In the Louisville district, however, Southern producers will have a decided advantage. Furthermore, the drop emphasizes strongly the isolated position occupied by southern Ohio makers, who are adhering to $19, base Ironton. It is obvious that they cannot hope to sell much tonnage at that figure, but high production costs will not permit them to name a lower price. Sales and inquiries in the past week have been meager. A northern Indiana melter is asking for 400 tons of foundry iron, and a southern Indiana company is expected to buy from 250 to 500 tons. The movement of Jackson County silvery iron is slow.

Prices per gross ton, delivered Cincinnati:

So. Ohio fdy., sil. 1.75 to 2.25...	$20.89
So. Ohio malleable.....$20.14 to	20.89
Alabama fdy., sil. 1.75 to 2.25...	19.69
Alabama fdy., sil. 2.25 to 2.75...	20.19
Tennessee fdy., sil. 1.75 to 2.25..	19.69
Southern Ohio silvery, 8 per cent	28.89

Freight rates, $1.89 from Ironton and Jackson, Ohio; $3.69 from Birmingham.

Finished Material.—Business booked in October by district offices of steel companies was considerably below normal, and no improvement is expected in the immediate future. Almost without exception consuming industries are operating on a part time basis and therefore are confining their purchases to small lots to cover current needs. Especially in the building construction field has the slump in activities been noticed. Fabricators have little work on hand and, in their desire to secure new jobs, have been shading prices. These concessions have become more pronounced in the past week. Gas holder fabricators are fairly busy at the moment. The Stacey Mfg. Co. has taken several small jobs, which will require a total of about 650 tons of steel. In the sheet market the price situation is rapidly getting worse. Galvanized stock is being sold at as low at 3.65c., base Pittsburgh, and indications are that a further drop may occur in the next week. Blue annealed is holding moderately well at 2.15c., base Pittsburgh, while black sheets are quoted at 2.90c., base Pittsburgh. The sheet tonnage sold in the last seven days has been of fairly liberal proportions, but is made up of numerous small orders on which prompt delivery is specified. The heavy rolled products, such as bars, shapes and plates, have been moving slowly, but quotations at 1.75c., base Pittsburgh, are undisturbed. Sales of wire goods have turned upward, although the volume is still unsatisfactory. Common wire nails continue to be sold at a delivered price of $2.69 per keg.

Reinforcing Bars.—In a building for the Sisters of the Precious Blood, Cincinnati, 100 tons of bars will be required. New billet bars continue to be quoted at 1.75c., base Pittsburgh, and rail steel bars at 1.70c., base mill.

Warehouse Business.—The total tonnage booked by local jobbers in October fell slightly below that in September. The decline in the demand for bars, shapes and plates has been largely responsible for the rather disappointing volume of business. Prices, however, have not been affected.

Coke.—Foundry coke specifications are still below normal for this time of the year, the curtailed demand from foundries allied with the automotive industry being partially responsible for this condition. Domestic coke is showing increased strength. The price of by-product foundry coke will continue at $7.50 per net ton, f.o.b. ovens, during November. Domestic walnut and No. 2 nut stand at $5 and $4.50, ovens, respectively, and egg size is selling at $5.50, ovens. By-product coke in Michigan will remain unchanged for the next 30 days.

Foundry coke prices per net ton, delivered Cincinnati: By-product coke, $9.52 to $9.64; Wise County coke, $7.59 to $8.09; New River coke, $10.09 to $10.59. Freight rates: $2.14 from Ashland, Ky.; $2.59 from Wise County and New River ovens.

Old Material.—Heavy melting steel is off 25c. a ton, but other items have not changed. Prices, however, are nominal, as transactions have been confined to small quantities of material. Many dealers in this territory believe that quotations have gone to such a low basis that they are not likely to recede further. Therefore, they are accumulating scrap and are refusing to sell it at today's market, believing that they will obtain higher prices within three months. The Baltimore & Ohio this week is offering a list of 26,000 tons, and the Big Four, 6600 tons.

Dealers' buying prices per gross ton f.o.b. cars, Cincinnati:

Heavy melting steel.....$11.50 to	$12.00
Scrap rails for melting..... 12.50 to	13.00
Loose sheet clippings..... 9.00 to	9.50
Bundled sheets ..... 9.50 to	10.00
Cast iron borings..... 8.50 to	9.00
Machine shop turnings..... 8.00 to	8.50
No. 1 busheling..... 10.50 to	11.00
No. 2 busheling..... 7.50 to	8.00
Rails for rolling..... 13.50 to	14.00
No. 1 locomotive tires..... 13.50 to	14.00
No. 1 railroad wrought..... 11.00 to	11.50
Short rails ..... 17.50 to	18.00
Cast iron carwheels..... 13.50 to	14.00
No. 1 machinery cast..... 16.50 to	17.50
No. 1 railroad cast..... 14.00 to	14.50
Burnt cast ..... 8.00 to	8.50
Stove plate ..... 9.50 to	10.00
Brake shoes ..... 10.00 to	10.75
Railroad malleable ..... 12.50 to	13.00
Agricultural malleable ..... 12.00 to	12.50

St. Louis

Scrap Continues to Weaken—7500 Tons of Bars Bought for Sewer

ST. LOUIS, Nov. 1.—The pig iron market continues quiet, recent price declines having had the effect of causing melters to be timid in placing orders for extended delivery. Bookings of the Granite City maker during the week totaled about 4800 tons, representing the purchases of more than 20 melters. The outstanding transactions were two lots of 500 tons each. Prices on Southern iron have declined to $16, base Birmingham.

Prices per gross ton at St. Louis:

No. 2 fdy., sil. 1.75 to 2.25 f.o.b. Granite City, Ill. .....$19.50 to	$20.00
Northern No. 2 fdy., delivered St. Louis	20.66
Southern No. 2 fdy., delivered...	20.42
Northern malleable, delivered...	20.66
Northern basic, delivered.....	20.66

Freight rates: 81c. from Granite City to St. Louis; $2.16 from Chicago; $4.42 from Birmingham.

Coke.—Buying of industrial grades is only fair, and the market for domestic fuel is quiet as a result of extremely warm weather.

Finished Iron and Steel.—One of the largest orders for reinforcing bars ever placed in St. Louis was awarded this week to the Laclede Steel Co.—7500 tons for the River Des Peres sewer, a St. Louis municipal project. Of this tonnage, 7400 tons will be rail bars and 100 tons billet bars. The sewer will require about two years to construct. The recent reduction in sheet prices has had the effect of shutting off new business, as buyers fear that there may be further price recessions. Tin plate business is holding up fairly well, but there is no buying of tank plates. Warehouse business is slow. The Missouri-Kansas-Texas Railroad, which recently inquired for 12,500 tons of rails, has postponed indefinitely the placing of orders. The Missouri Pacific

Warehouse Prices, f.o.b. St. Louis

	Base per Lb.
Plates and structural shapes.....	3.25c.
Bars, soft steel or iron.....	3.15c.
Cold-finished rounds, shafting and screw stock	3.75c.
Black sheets (No. 24).....	4.80c.
Galvanized sheets (No. 24).....	5.35c.
Blue annealed sheets (No. 10).....	3.60c.
Black corrugated sheets.....	4.65c.
Galvanized corrugated sheets.....	5.30c.
Structural rivets	3.60c.
Boiler rivets	3.80c.
	Per Cent Off List
Tank rivets, $\frac{7}{8}$-in. and smaller.....	70
Machine bolts	60
Carriage bolts	60
Lag screws	60
Hot-pressed nuts, square, blank or tapped...	60
Hot-pressed nuts, hexagon, blank or tapped..	60

Railroad is expected to issue an inquiry shortly for its rail requirements for the first half of 1928.

Old Material.—The only transaction of importance in weeks, the purchase of 5000 tons of heavy melting steel by one of the mills in this district, was closed within the past few days. The material is to be delivered over a period of 60 days. The order was divided among a number of dealers, 1000 tons being the largest single allotment. The market shows further weakness as the result of light buying by most consumers and heavy railroad lists. This week's offerings total 64,900 tons, as follows: Pennsylvania, 39,020 tons; New York Central, 5000 tons (relaying rails); Missouri Pacific, 5500 tons; Chicago, Milwaukee & St. Paul, 5400 tons; Chicago, Burlington & Quincy and Big Four lines, 4000 tons each; Union Pacific, 2000 tons; and St. Louis-San Francisco 750 tons. Railroad springs and cast iron carwheels are off 50c. a ton, and No. 1 busheling, rails for rolling and steel angle bars are 25c. a ton lower.

Prices per gross ton f.o.b. dealers' yards and delivered St. Louis district consumers' works:

Heavy melting steel	$11.00 to $11.25
No. 1 locomotive tires	13.00 to 13.50
Heavy shoveling steel	11.00 to 11.25
Miscellaneous standard-section rails, including frogs, switches and guards, cut apart	13.25 to 13.50
Railroad springs	13.50 to 14.00
Bundled sheets	8.00 to 8.50
No. 2 railroad wrought	11.00 to 11.25
No. 1 busheling	9.50 to 10.00
Cast iron borings	9.00 to 9.50
Iron rails	12.50 to 13.00
Rails for rolling	14.00 to 14.50
Machine shop turnings	6.00 to 6.50
Steel car axles	19.00 to 19.50
Iron car axles	23.00 to 23.50
Wrought iron bars and transoms	19.50 to 20.00
No. 1 railroad wrought	10.00 to 10.50
Steel rails, less than 3 ft.	15.00 to 15.50
Steel angle bars	11.00 to 11.25
Cast iron carwheels	12.50 to 13.00
No. 1 machinery cast	13.00 to 13.50
Railroad malleable	11.00 to 11.50
No. 1 railroad cast	12.50 to 13.00
Agricultural malleable	11.50 to 12.00
Relaying rails, 60 lb. and under	20.50 to 23.50
Relaying rails, 70 lb. and over	26.50 to 29.00

Boston

Pig Iron Stagnant, Scrap Soft—Sizable Reinforcing Projects in Prospect

BOSTON, Nov. 1.—The pig iron market remains generally dull, but with some symptoms of picking up slightly. The fact that most foundries are well caught up on supplies has brought some interest in first quarter coverings.

Prices of foundry iron per gross ton, delivered to most New England points:

Buffalo, sil. 1.75 to 2.25	$20.91 to $21.91
Buffalo, sil. 2.25 to 2.75	21.41 to 22.41
East. Penn., sil. 1.75 to 2.25	22.65 to 23.15
East. Penn., sil. 2.25 to 2.75	23.15 to 23.65
Virginia, sil. 1.75 to 2.25	25.96 to 26.21
Virginia, sil. 2.25 to 2.75	26.46 to 26.71
Alabama, sil. 1.75 to 2.25	24.16 to 26.02
Alabama, sil. 2.25 to 2.75	24.66 to 26.52

Freight rates: $4.91 from Buffalo, $3.65 from eastern Pennsylvania, $5.21 all rail from Virginia, $6.91 to $8.77 from Alabama.

Coke.—There is to be no price change by Boston or Providence producers of foundry coke for November. Shipments of coke are picking up as a result of seasonal demands.

Cast Iron Pipe.—There is a noticeable stiffening in prices on small sizes of pressure pipe, but at the same time weakness has developed for sizes 16 in. in diameter and larger. Bids on 4000 tons of 4-in. to 16-in. pipe were opened on Oct. 26 by the town of Marshfield, Mass., but no award has yet been made. The gas company that has been feeling out the market for the first quarter and half continues to ask for prices on 4000 tons, but orders are not likely to be placed for some time.

Structural Steel.—While little fabricating work is being figured, considerable tonnage is in prospect. Mill prices remain firm, and as many buyers are running out of stock, some replenishment buying is expected to develop soon. The only sizable fabricating awards of the week were placed with the New England Structural Co., which booked 200 tons for the Argonaut sales and service station of the General Motors Corporation in Brighton, Mass., and 160 tons for the Commonwealth Ice & Cold Storage Co. of Boston.

Reinforcing Steel.—Small lettings continue in fair volume. Work in prospect includes 500 tons for two battalion buildings at Camp Devens, Ayer, Mass., upon which bids are expected to be opened this week. For the Border Street Outlet, in East Boston, for which some 475 tons will be required, the general contract was awarded to the C. & R. Construction Co., the lowest bidder.

Old Material.—Except for the purpose of converting stock into cash and sometimes at small recessions, there can be found little trace of business. There have been some shipments to eastern Pennsylvania of machinery cast for steel mill purposes, but there has been practically no demand for heavy melting steel.

Buying prices per gross ton f.o.b. Boston rate shipping points:

No. 1 heavy melting steel	$8.50 to $9.00
Scrap rails	8.50 to 8.75
No. 1 railroad wrought	10.50 to 11.00
No. 1 yard wrought	9.00 to 9.50
Machine shop turnings	5.60 to 5.85
Cast iron borings (steel works and rolling mill)	6.00 to 6.50
Bundled skeleton, long	5.60 to 5.85
Forged flashings	6.50 to 7.00
Blast furnace borings and turnings	5.50 to 6.00
Forge scrap	5.75 to 6.00
Shafting	13.00 to 13.50
Street car axles	17.00 to 17.50
Wrought pipe (1 in. in diameter, over 2 ft. long)	8.00 to 8.50
Rails for rerolling	10.50 to 11.00
Cast iron borings, chemical	10.60 to 10.85

Prices per gross ton delivered consumers' yards:

Textile cast	$15.00 to $15.50
No. 1 machinery cast	15.00 to 15.50
No. 2 machinery cast	12.50 to 13.00
Stove plate	12.00 to 12.50
Railroad malleable	14.00 to 14.50

Warehouse Prices, f.o.b. Boston

	Base per Lb.
Plates	3.365c.
Structural shapes—	
Angles and beams	3.365c.
Tees	3.365c.
Zees	3.465c.
Soft steel bars and small shapes	3.265c.
Flats, hot-rolled	4.15c.
Reinforcing bars	3.265c. to 3.54c.
Iron bars—	
Refined	3.265c.
Best refined	4.60c.
Norway, rounds	6.60c.
Norway, squares and flats	7.10c.
Spring steel—	
Open-hearth	5.00c. to 10.00c.
Crucible	12.00c.
Tire steel	4.50c. to 4.75c.
Bands	4.015c. to 5.00c.
Hoop steel	5.50c. to 6.00c.
Cold rolled steel—	
Rounds and hexagons	4.05c.
Squares and flats	4.55c.
Toe calk steel	6.00c.

Buffalo

Pig Iron Shipments Large but New Buying Is Light—Scrap Weaker

BUFFALO, Nov. 1.—The pig iron market reflects dull conditions among the foundries. Inquiry is at a minimum, and there has been no tonnage out to really test current quotations, which are $17, Buffalo furnace, for No. 2 plain and $17.50 for malleable. Reports of low prices made by Buffalo furnaces on New England iron are not borne out by information obtainable here. Shipping directions are in fairly good volume, and some

Warehouse Prices, f.o.b. Buffalo

	Base per Lb.
Plates and structural shapes	3.40c.
Soft steel bars	3.30c.
Reinforcing bars	2.75c.
Cold-finished flats, squares and hexagons	4.45c.
Rounds	3.95c.
Cold rolled strip steel	5.85c.
Black sheets (No. 24)	4.30c.
Galvanized sheets (No. 24)	5.15c.
Blue annealed sheets (No. 10)	3.80c.
Common wire nails, base per keg	$3.65
Black wire, base per 100 lb.	3.90

iron is being moved east via barge canal, resulting in a lower delivered price in the East, though $17 is the price at furnace. Inquiries that have appeared during the week aggregate only about 1000 tons.

Prices per gross ton, f.o.b. furnace:

No. 2 plain fdy., sil. 1.75 to 2.25	$17.00
No. 2X foundry, sil. 2.25 to 2.75	17.50
No. 1X foundry, sil. 2.75 to 3.25	18.50
Malleable, sil. up to 2.25	17.50
Basic	17.00
Lake Superior charcoal	27.28

Finished Iron and Steel.—Demand for carbon steel bars is somewhat better, with prices holding at 2.015c., Buffalo. Structural shapes are commanding the same price, and plates are fairly firm at 2.065c., Buffalo. The new structural mill of the Bethlehem Steel Co. for making Bethlehem sections is now in full operation. Sheet demand has picked up a little, with prices unchanged at 2.90c., base Pittsburgh, for black, 3.75c. for galvanized and 4.15c. for automobile body. Warehouse business was slightly better in October than in September. The reinforcing bar market is active. Locally a new school will require 100 tons, the substructure for Bailey Avenue bascule bridge will take 140 tons, and a branch Y. M. C. A. building, 100 tons. One hundred tons for foundation work for the Huron Cement Co. mill has been placed with a Buffalo maker. Steel for the superstructure and storage bins will be let later. There will be 15 bins, each 80 ft. high.

Old Material.—While there has been an entire absence of new buying, dealers believe that mill stocks are running so low that purchasing will be necessary in the next two weeks. All scrap prices are nominal, and there has been a sentimental weakening in certain grades, such as railroad coil and leaf springs, stove plates, grate bars, cast iron carwheels and hydraulic compressed sheets. One of the larger mills continues to restrict its shipments.

Prices per gross ton, f.o.b. Buffalo consumers' plants:

Basic Open-Hearth Grades	
No. 1 heavy melting steel	$14.50 to $15.00
No. 2 heavy melting steel	13.00 to 13.50
Scrap rails	14.50 to 15.00
Hydraulic compressed sheets	12.00 to 12.25
Hand bundled sheets	9.00 to 9.50
Drop forge flashings	11.50 to 12.00
No. 1 busheling	13.00 to 13.25
Heavy steel axle turnings	12.75 to 13.25
Machine shop turnings	9.25 to 9.50
Acid Open-Hearth Grades	
Railroad knuckles and couplers	15.75 to 16.00
Railroad coil and leaf springs	16.50 to 17.00
Rolled steel wheels	15.50 to 16.00
Low phosphorus billet and bloom ends	16.00 to 16.50
Electric Furnace Grades	
Heavy steel axle turnings	12.75 to 13.25
Short shoveling steel turnings	10.75 to 11.00
Blast Furnace Grades	
Short shoveling steel turnings	10.75 to 11.00
Short mixed borings and turnings	9.75 to 10.00
Cast iron borings	10.00 to 10.50
No. 2 busheling	9.00 to 9.50
Rolling Mill Grades	
Steel car axles	15.00 to 16.00
No. 1 railroad wrought	12.00 to 12.50
Cupola Grades	
No. 1 machinery cast	14.75 to 15.25
Stove plate	12.75 to 13.00
Locomotive grate bars	10.50 to 11.00
Steel rails, 3 ft. and under	16.00 to 16.50
Cast iron carwheels	14.00 to 14.50
Malleable Grades	
Railroad	15.00 to 15.50
Agricultural	15.00 to 15.50
Industrial	15.00 to 15.50

American-La France Purchases Foamite-Childs Corporation

Directors of the Foamite-Childs Corporation, Utica, N. Y., manufacturer of fire fighting apparatus and equipment, have authorized the sale of the company to the American-La France Fire Engine Co., Elmira, N. Y., for $3,400,000 in the preferred and common stocks of the latter company. The capitalization of the American-La France organization will be increased from $5,000,000 common and $5,000,000 preferred stock to $7,500,000 of each, and the name of the company will be changed to the American-La France & Foamite Corporation. The directorate will be increased from 11 to 15.

Detroit

Steel Specifications Expected to Decline with Approach of Inventory-Taking

DETROIT, Nov. 1.—In the steel trade the chief development of interest in the automotive field was the release of the Buick Motor Co.'s November specifications in full-finished sheets. If previous practice is followed, the General Motors Corporation plants will start taking inventory about the middle of next month, so that the specifications mentioned probably will be the last from that organization until the first of the year.

The production of the Buick Motor Co. is about 950 cars per day, as compared with a peak output of about 1100.

Automotive interests are adhering rigidly to a hand-to-mouth buying policy, with practically no steel tonnage stocked.

Automobile body sheets have shown no deflection from 4.15c., Pittsburgh, while box annealed seems to be holding fairly well at 2.90c. Prices for blue annealed are variable because of competition from continuous strip mills. On the wider sizes 2.10c., Pittsburgh, is the ruling price.

There has been practically no change in either tonnage or price on alloy steel bars. S. A. E. Series No. 2300 is bringing $4.10 to $4.15 per 100 lb., mill, No. 3300, $6.75 to $6.90, No. 5100, $3.10 to $3.18.

While there are no large tonnage inquiries this week for structural or fabricated steel, the volume of small-lot business has held up and seems to be increasing slightly. Plain material remains firm at 1.75c., Pittsburgh.

Shipments of pig iron for the district during October were above those of September, and promise to continue at the October rate this month.

Old Material.—The market in old material has shown no tendency to strengthen, with prices the same as quoted a week ago.

Dealers' buying prices per gross ton, f.o.b. cars, Detroit:

Heavy melting and shoveling steel	$11.75 to $12.25
Borings and short turnings	8.50 to 9.00
Long turnings	7.50 to 8.00
No. 1 machinery cast	17.00 to 18.00
Automobile cast	18.00 to 19.00
Hydraulic compressed sheets	10.50 to 11.00
Stove plate	11.50 to 12.50
No. 1 busheling	9.50 to 10.00
Sheet clippings	7.50 to 8.00
Flashings	9.75 to 10.25

Increase Wage Rate for Sheet Mill Workers

YOUNGSTOWN, Nov. 1.—For the first time in many months, tonnage rates for sheet and tin mill workers in Mid-Western mills subscribing to the sliding scale wage agreement of the Amalgamated Association of Iron and Steel Workers advance as a result of the bi-monthly settlement. For November-December, such rates increase 3 per cent of the base rate, to 28½ per cent above base. The examination of sales sheets submitted by subscribing mills revealed an average selling price of 3.10c. per lb. on Nos. 26, 27 and 28 gage black sheets shipped during the preceding 60 days, against an average of 3c. disclosed two months before.

It is expected that the next bi-monthly settlement will show a decline, in view of the weakening in sheet prices in the meantime.

The settlement was conducted at Youngstown, Elias Jenkins representing the manufacturers and M. F. Tighe of Pittsburgh the Amalgamated association.

Two more specifications in Portuguese and English have been issued by the Bureau of Foreign and Domestic Commerce, Department of Commerce. They are the standards as adopted by the American Society for Testing Materials. One, No. 209, covers specifications for structural steel for buildings and the other, No. 213, covers specifications for steel castings.

MOVING LOCOMOTIVE PLANT

Baldwin Works Now Concentrated at Eddystone, Away from Congested Areas

TWO papers read before a branch meeting of the American Society of Mechanical Engineers in the Engineers Club, Philadelphia, in October, had to do with the moving of the Baldwin Locomotive Works from a congested area in the heart of Philadelphia to the new plant which has been gradually developed at Eddystone, Pa., during the past dozen or more years. As much as 25 years ago pressure at the city plant became so great that an additional finishing plant was built considerably farther out. The large works had developed section by section as they became needed, with the usual result of lack of continuity of movement of parts and much confusion. Large locomotive boilers were built on the first, second and third floors of five different buildings. During periods of great activity, it was necessary to run the plant day and night, with resulting great annoyance at night to residents in the vicinity. Most of the buildings in the Philadelphia plant were multi-story, the highest being six stories.

In 1905 the old Gruson Iron Foundry at Eddystone, 10 miles down the Delaware River from Philadelphia, was purchased, with 183 acres of land. The Baldwin iron foundry and forge shops were moved into the new location a year later, while the heavy forging equipment was taken to Burnham, Pa., more than 100 miles west of Philadelphia, to the Standard Steel Works, a subsidiary of the Baldwin company. In 1909 the first three bays of a new erecting shop were built at Eddystone, this building being completed in 1912. The track arrangement permits locomotives to leave the shop from any bay on their own wheels—a great improvement over the difficult conditions at Philadelphia. During the World War, as many as 70 locomotives a week were being turned out here under this arrangement.

Several large buildings were erected during the war period, some of which, then used for munitions, have since been converted to peace-time occupations. A tender and tank shop, started in 1923, was finished in 1926. A new machine shop is being constructed for machining rods, guides, cross-heads, pistons, bolts and bushings. A brass foundry and brass machine shop adjoin it. This new shop covers 16.9 acres, in contrast with which the entire Philadelphia plant covers 19.6 acres. The tank and tender shop covers 14.3 acres and many of the others are large.

This gradual development, greatly accelerated in 1917, has permitted almost complete withdrawal of department after department from Philadelphia. In moving each department, care had to be exercised to prevent interfering with production. This meant that certain machines had to be moved, set up and started working at Eddystone before other machines doing the same operation could be interfered with at Philadelphia. Along with the moving of one department after another came the moving of the organization, until now practically all the work is concentrated at the new location.

Following the erecting shop, other departments were moved in a certain sequence, beginning with the pattern shop, the wheel and axle, the cylinder, then the frame, cross-tie and guide bearer shops. When it was determined to finish the moving by 1928, the remaining sheet iron working shops were moved in less than a month. The shops remaining are soon to be housed in the large machine shop above mentioned.

Foundations for each heavy machine were built at Eddystone before the machine was cut loose from its city location. Solid rock was available as a base near the river, and this is the location of the largest and heaviest equipment. Some of the machines rest on a 12 in. concrete mat, carried in turn by a number of piles 20 ft. long.

The two papers from which the above notes were taken were prepared by B. T. Converse and Henry E. Bilger of the Baldwin organization.

Further Statements of Third Quarter Earnings

Further sharp recessions in earnings are reported by steel companies which have released financial reports for the third quarter during the last week. The Wheeling Steel Corporation, Wheeling, W. Va., reports a slight gain over the preceding quarter and the Central Alloy Steel Corporation, Massillon, Ohio, shows a slight improvement over the third quarter last year; but in other cases third quarter reports show sharp decreases from both the preceding quarter and the third quarter of 1926. Likewise the companies all show reduced earnings in the nine-month period this year as compared with last.

Earnings Available for Dividends (Thousands of Dollars)

Name of Company	1927 Third Quarter	1927 Second Quarter	1926 Third Quarter	1927 First 9 Mo.	1926 First 9 Mo.
Bethlehem Steel Corporation	2,788	5,049	4,551	13,455	15,765
Youngstown Sheet & Tube Co.	1,539	2,062	4,007	5,857	11,994
Wheeling Steel Corporation	900	856	1,295	2,748	3,583
Central Alloy Steel Corp.	810	1,245	789	2,648	3,432

Proposes Tax Relief for Corporations

WASHINGTON, Nov. 1.—Presenting the administration program, Secretary of the Treasury Mellon appeared yesterday before the Ways and Means Committee of the House of Representatives when it opened its tax hearings and as one of the outstanding features recommended a reduction of the rate of tax on corporate income from 13.5 per cent to 12 per cent for the fiscal year 1929. He estimated that such a change will result in a loss in revenue of approximately $135,000,000. Many business interests of the country have striven to have the present rate reduced, most of them urging a sharper cut than Secretary Mellon asked.

Secretary Mellon recommended also that those provisions of the law which apply to the tax on corporate income be amended to permit corporations with net income of $25,000 or less, and with not more than ten stockholders, to file returns and pay the tax as partnerships, at their option. It is estimated that such an amendment will result in a loss of from $30,000,000 to $35,000,000 in revenue.

Imports of Ore

Iron ore imported into the United States in September amounted to 224,524 tons. This was a sharp reduction from the high figure in August, when 303,586 tons came in—the largest total in about three years. For the nine months of the year, imports have aggregated 2,061,028 tons, an increase of 4½ per cent over the corresponding figure for 1926. There has been a reduction of about 114,000 tons in imports from Cuba, which is more than offset by a gain of 98,000 tons from French Africa and of 165,000 tons from Sweden.

Sources of American Imports of Iron Ore

(In Gross Tons)

	September		Nine Months Ended September	
	1927	1926	1927	1926
Chile	131,000	111,000	1,044,600	1,040,200
Cuba	22,000	46,000	314,613	428,500
Spain	15,100	.....	26,717	82,412
Sweden	7,676	7,445	195,802	30,250
French Africa	31,849	44,871	370,822	273,062
Canada	1,962	1,069	16,235	15,817
Other countries	14,937	21,975	92,239	104,101
Totals	224,524	232,360	2,061,028	1,974,342

Members of the Milwaukee Chapter, American Society for Steel Treating, have completed arrangements for a series of six illustrated lectures by Prof. John F. Keller, steel specialist, department of engineering, Purdue University, under the auspices of the engineering extension division of the A. S. S. T. The first lecture will be given Nov. 10.

NON-FERROUS METAL MARKETS

The Week's Prices

Cents per Pound for Early Delivery

	Nov. 1	Oct. 31	Oct. 29	Oct. 28	Oct. 27	Oct. 26
Lake copper, N. Y.	13.25	13.25	13.25	13.25	13.25	13.25
Electrolytic copper, N. Y.*	13.00	13.00	13.00	13.00	13.00	13.00
Straits tin, spot, N. Y.	57.50	57.55	....	57.70	58.05	58.62½
Lead, New York	6.25	6.25	6.25	6.25	6.25	6.25
Lead, St. Louis	5.95	5.95	5.95	5.95	5.95	5.95
Zinc, New York	6.15	6.15	6.15	6.20	6.25	6.25
Zinc, St. Louis	5.80	5.80	5.80	5.85	5.90	5.90

*Refinery quotation; delivered price ¼c. higher.

NEW YORK, Nov. 1.—None of the markets is particularly active. Copper is stronger with quite a little more buying. Tin prices are lower than a week ago, but there has been a fair amount of activity. There has been no change in lead. The zinc market is considerably weaker.

Copper.—After a week of comparative dullness so far as buying by domestic consumers is concerned, the market today is considerably more active and stronger and quite a little metal has been bought at 13.25c., delivered in the Connecticut Valley. No electrolytic copper is available as low as this level, and at least two producers have withdrawn from the market at that price and are now asking a minimum of 13.37½c., delivered. It is conceded that consumers must buy considerable copper for November and of course for December. In the past week sales to foreign consumers, particularly in Germany, have been quite heavy, but the price of Copper Exporters, Inc., is unchanged at 13.60c., c.i.f. Hamburg. It is stated that 58,000 to 59,000 tons was sold for export during October, which is a fairly heavy record. Lake copper is quoted at 13.25c. to 13.37½c., delivered.

Copper Averages.—The average price of Lake copper for the month of October, based on daily quotations in THE IRON AGE, was 13.25c., delivered. The average price of electrolytic copper was 12.98c., refiners, or 13.23c., delivered in the Connecticut Valley.

Tin.—Events in the market have not been extraordinary, but total sales at 1100 tons for the week ended Saturday were quite large. Thursday and Friday, Oct. 27 and 28, were the most active days and consumers bought quite extensively. Yesterday, Monday, about 200 tons changed hands and today sales have been moderate with spot Straits tin quoted at 57.50c., New York. Prices in London today were considerably lower than a week ago with spot standard quoted at £259 12s. 6d., future standard at £256 15s. and spot Straits at £267 2s. 6d. The Singapore market today was £262 5s. per ton. Deliveries into consumption for October were 6005 tons with 3158 tons in stock and landing on Oct. 31. Arrivals for the month were 7190 tons and imports for the ten months have been 63,539 tons. Preliminary estimates place the decrease for the month in the world's visible supply at between 400 and 500 tons.

Lead.—The market is quiet and steady with the contract price of the leading interest unchanged at 6.25c., New York. In the outside market there has been practically no change with the metal available at St. Louis at 5.95c. Inquiry from consumers is only fair.

Zinc.—At 5.80c., St. Louis, prime Western zinc is at the lowest price since July 15, 1924. The market has steadily weakened in the last week, but not very much business is reported. The supply is greater than the demand which is also true of ore which has now reached $37 per ton at Joplin with production nearly 16,000 tons last week and stocks piling up rather rapidly. Just when the low point in prime Western zinc will be reached is uncertain, but lower prices seem to be expected before the upward swing starts in.

Nickel.—Wholesale lots of ingot nickel are quoted at 35c., with shot nickel at 36c. and electrolytic nickel at 39c. per lb.

Antimony.—Chinese metal for spot delivery is unchanged at 11c., New York, duty paid, with futures at

Metals from New York Warehouse

Delivered Prices Per Lb.

Tin, Straits pig	59.50c. to 60.50c.
Tin, bar	61.50c. to 62.50c.
Copper, Lake	14.50c.
Copper, electrolytic	14.25c.
Copper, casting	13.75c.
Zinc, slab	7.50c. to 8.50c.
Lead, American pig	7.50c. to 8.50c.
Lead, bar	9.75c. to 10.75c.
Antimony, Asiatic	13.00c. to 14.00c.
Aluminum No. 1 ingot for remelting (guaranteed over 99 per cent pure)	27.00c. to 28.00c.
Aluminum ingots, No. 12 alloy	26.00c. to 27.00c.
Babbitt metal, commercial grade	30.00c. to 40.00c.
Solder, ½ and ½	39.25c. to 40.25c.

Metals from Cleveland Warehouse

Delivered Prices Per Lb.

Tin, Straits pig	64.00c.
Tin, bar	66.00c.
Copper, Lake	14.00c.
Copper, electrolytic	14.00c.
Copper, casting	13.25c.
Zinc, slab	7.75c.
Lead, American pig	7.00c.
Antimony, Asiatic	16.00c.
Lead, bar	9.25c.
Babbitt metal, medium grade	19.50c.
Babbitt metal, high grade	67.25c.
Solder, ½ and ½	38.00c.

Rolled Metals from New York or Cleveland Warehouse

Delivered Prices, Base Per Lb.

Sheets—	
High brass	18.25c. to 19.00c.
Copper, hot rolled	22.00c. to 23.00c.
Copper, cold rolled, 14 oz. and heavier	24.25c. to 25.25c.
Seamless Tubes—	
Brass	23.12½c. to 24.12½c.
Copper	24.00c. to 25.00c.
Brazed Brass Tubes	26.25c. to 27.25c.
Brass Rods	16.00c. to 17.00c.

From New York Warehouse

Delivered Prices, Base Per Lb.

Zinc sheets (No. 9), casks	10.50c. to 11.00c.
Zinc sheets, open	11.00c. to 11.25c.

Non-Ferrous Rolled Products

Mill prices on bronze, brass and copper products have not changed since the advances of Aug. 3. Zinc sheets and lead full sheets are being quoted at the levels established Aug. 5 and Oct. 5 respectively.

List Prices, Per Lb., f.o.b. Mill

On Copper and Brass Products, Freight up to 75c. per 100 Lb. Allowed on Shipments of 500 Lb. or Over

Sheets—	
High brass	18.25c.
Copper, hot rolled	22.00c.
Zinc	10.00c.
Lead (full sheets)	9.75c. to 10.00c.
Seamless Tubes—	
High brass	23.12½c.
Copper	24.00c.
Rods—	
High brass	16.00c.
Naval brass	18.75c.
Wire—	
Copper	15.25c.
High brass	18.75c.
Copper in Rolls	21.00c.
Brazed Brass Tubing	26.25c.

Aluminum Products in Ton Lots

The carload freight rate is allowed to destinations east of Mississippi River and also allowed to St. Louis on shipments to destinations west of that river.

Sheets, 0 to 10 gage, 3 to 30 in. wide	33.00c.
Tubes, base	42.00c.
Machine rods	34.00c.

Rolled Metals, f.o.b. Chicago Warehouse

(Prices Cover Trucking to Customers' Doors in City Limits)

Sheets—	Base per Lb.
High brass	19.25c.
Copper, hot rolled	22.00c.
Copper, cold rolled, 14 oz. and heavier	24.25c.
Zinc	11.00c.
Lead, wide	9.75c.
Seamless Tubes—	
Brass	24.62½c.
Copper	25.50c.
Brazed Brass Tubes	28.50c.
Brass Rods	16.00c.

11.25c. There has been a fair amount of consumer buying.

Aluminum.—Virgin metal, 98 to 99 per cent pure, is quoted at 25c. to 26c. per lb., delivered.

Non-Ferrous Metals at Chicago

CHICAGO, Nov. 1.—The moderate buying movement that was under way early in the week has disappeared and the markets are again quiet with lower prices in copper, tin and zinc. The old metal market is listless.

Prices, per lb., in carload lots: Lake copper, 13.37½c.; tin, 59c.; lead, 6.10c.; zinc, 6c.; in less-than-carload lots, antimony, 12.50c. On old metals we quote copper wire, crucible shapes and copper clips, 10c.; copper bottoms, 9c.; red brass, 9c.; yellow brass, 6.75c.; lead pipe, 5c.; zinc, 3.50c.; pewter, No. 1, 34c.; tin foil, 43.50c.; block tin, 52c.; aluminum, 13c.; all being dealers' prices for less-than-carload lots.

FABRICATED STRUCTURAL STEEL

Awards of Week Total About 21,500 Tons and New Projects Amount to 12,000 Tons

Structural steel awards in the past week amounted to about 21,500 tons, while new work added to pending projects totaled less than 12,000 tons. The largest awards were 3200 tons for college buildings at Durham, N. C., and 3000 tons for a manufacturing plant at Elizabethton, Tenn. Awards follow:

SOUTH AMBOY, N. J., 125 tons, State highway bridge, to Phoenix Bridge Co.

BUFFALO, 1700 tons, Buffalo General Electric Co. power plant extension, to Fort Pitt Bridge Works.

TEMPLETON, PA., 400 tons, kiln building for Harbison-Walker Refractories Co., to Jones & Laughlin Steel Corporation.

NEW ORLEANS, 1400 tons, Jung Hotel, to Lukens Steel Co. of New Orleans.

BOSTON, 160 tons, Commonwealth Ice & Cold Storage Co., to New England Structural Co.

BRIGHTON, MASS., 200 tons, Argonaut sales and service station, to New England Structural Co.

NEW YORK, 700 tons, Pan-Hellenic House on Fortieth Street, to Harris Structural Steel Co.

NEW YORK, 400 tons, four apartment buildings, to an unnamed fabricator.

NEW YORK, 640 tons, four-story garage at 101st Street and Broadway and Rockefeller Institute at Sixty-sixth Street and Avenue A, to Taylor-Fichter Steel Construction Co.

NEW YORK, 750 tons, public school No. 225 at Brighton Beach and public school No. 90 on 166th Street, to Bethlehem Fabricators, Inc.

NEW YORK, 550 tons, garage at Northern Boulevard and Forty-fifth Street, Queens, to National Bridge Works.

NEW YORK, 135 tons, bank and office building for National City Co. at 123 East Eighty-sixth Street, to Easton Structural Steel Co.

BROOKLYN, 170 tons, school at 137 McDonough Street, to Buckingham Steel Co.

EAST ORANGE, N. J., 1100 tons, apartment building at 67 Munn Avenue, to Bethlehem Fabricators, Inc.

POTTSVILLE, PA., 150 tons, 300,000 cu. ft. gas holder, to Stacey Mfg. Co.

HOPEWELL, VA., 200 tons, fuel condensers and saturators, to Stacey Mfg. Co.

DURHAM, N. C., 3200 tons, medical school and hospital, Duke University, to Virginia Bridge & Iron Co.

DURHAM, 450 tons, dormitories for Duke University, to Carolina Steel & Iron Co.

Old Metals, Per Lb., New York

The buying prices represent what large dealers are paying for miscellaneous lots from the smaller accumulators and the selling prices are those charged consumers after the metal has been properly prepared for their use.

	Dealers' Buying Prices	Dealers' Selling Prices
Copper, heavy crucible	11.25c.	12.75c.
Copper, heavy and wire	11.00c.	12.00c.
Copper, light and bottoms	9.50c.	10.50c.
Brass, heavy	7.00c.	8.50c.
Brass, light	5.50c.	7.25c.
Heavy machine composition	9.00c.	10.25c.
No. 1 yellow brass turnings	7.75c.	8.25c.
No. 1 red brass or composition turnings	8.00c.	9.00c.
Lead, heavy	5.125c.	5.375c.
Lead, tea	4.25c.	4.75c.
Zinc	3.75c.	4.25c.
Sheet aluminum	13.00c.	15.00c.
Cast aluminum	12.75c.	14.75c.

ELIZABETHTON, TENN., 3000 tons, factory for American Glanzstoff Corporation, to McClintic-Marshall Co.

KNOXVILLE, TENN., 110 tons, Volunteer Portland Cement Co. plant, to Ingalls Iron Works.

BIRMINGHAM, 1400 tons, power house for Alabama Power Co., to Ingalls Iron Works.

MOBILE, ALA., 650 tons, wharf for coal handling plant at Alabama State Docks, to Virginia Bridge & Iron Co.

CHICAGO, 1400 tons, Schedd Aquarium, to Vanderkloot Steel Works, local.

CHICAGO, 350 tons, building for W. F. Hall Printing Co., to A. Bolters Sons, local.

MILWAUKEE, 250 tons, George H. Walker Junior High School, to Wisconsin Bridge & Iron Co.

SEATTLE, WASH., 400 tons, 4 to 18-in. pipe line for United States Stores, Alaska, to Western Pipe & Steel Co.

SAN FRANCISCO, 100 tons, Crane Warehouse Co., to Dyer Brothers.

OAKLAND, CAL., 100 tons, 20-in. pontoon pipe for the Port Commission, to Steel Tank & Pipe Co.

MANILA, P. I., 1200 tons, bridge for Manila Railway, to Atlantic, Gulf & Pacific Co.

Structural Projects Pending

Inquiries for fabricated steel work include the following:

PHILADELPHIA, 1200 tons, apartment building at Thirteenth and Chancellor Streets.

OCEAN CITY, N. J., 1500 tons, bridge connecting Ocean City with Longport; Phoenix Bridge Co. low bidder.

ATLANTA, 1500 tons, Chevrolet Motor Co. assembling plant.

ATLANTA, 2000 tons, Shriners' temple.

TOLEDO, OHIO, 125 tons, Western Avenue bridge.

NEW YORK CENTRAL RAILROAD, 150 tons, freight house in Buffalo.

NEW YORK CENTRAL RAILROAD, 400 tons, bridges.

BROOKLYN, 1500 tons, junior high school No. 96.

JAMAICA, L. I., 500 tons, theater.

HARRISON, N. Y., 1000 tons, factory building for the Intertype Corporation, project abandoned.

INDIANAPOLIS, 150 tons, State School for the Blind.

CHICAGO, 800 tons, Sisters of Providence High School.

KANSAS CITY, MO., 1500 tons, building for Southwest Bell Telephone Co.

MIDVALE, UTAH, 500 tons, flue system for United States Smelting & Mining Co.

SEATTLE, WASH., 900 tons, viaduct for Union Pacific Railroad.

LOS ANGELES, 520 tons, berths 230 D and E and 232 A and B San Pedro; bids Nov. 2.

EUREKA, CAL., 140 tons, hospital; plans revised and frame structure to be erected.

Railroad Equipment Buying

The Chicago, Milwaukee & St. Paul has ordered 10 steel baggage car bodies from the American Car & Foundry Co.

The Chicago & North Western contemplates making inquiry for 750 freight cars.

The Chicago, South Shore & South Bend has ordered two 80-ton electric locomotives from the Baldwin Locomotive Works.

REINFORCING STEEL

Awards of 11,225 Tons Include 7500 Tons for a St. Louis Sewer Project

The week's awards of concrete reinforcing steel were swelled to a total of 11,225 tons by a St. Louis sewer project which calls for 7500 tons. It was taken by the Laclede Steel Co. A total of about 3700 tons in new projects came up for bids during the week. Awards follow:

BUFFALO, 100 tons, foundation work for bins for Huron Cement Co., to a local maker.

PITTSBURGH, 200 tons, Pennsylvania State road work, to Concrete Steel Co., Pittsburgh.

PITTSBURGH, 1000 tons, Grant Building, to Truscon Steel Co.

SAVANNAH, TENN., 800 tons, Tennessee River bridge, to Gulf States Steel Co.

CHATTANOOGA, TENN., 100 tons, Leventhal garage, to Connors Steel Co., Birmingham.

CHICAGO, 100 tons of rail steel, apartment building at 6734 Oglesby Avenue, to Calumet Steel Co.

CHICAGO, 250 tons of rail steel bars, hotel at 5000 East End Avenue, to Inland Steel Co.

ROCKFORD, ILL., 200 tons of rail and billet steel bars, garage, to Olney J. Dean & Co.

ROCK ISLAND, ILL., 140 tons, Royal Neighbors building, to Concrete Engineering Co.

MILWAUKEE, 100 tons, Shorwood Physical Education Building, to Concrete Engineering Co.

ST. LOUIS, 7500 tons, 7400 tons of rail steel bars and 100 tons of billet steel bars for River Des Peres sewer, to Laclede Steel Co.

OAKLAND, CAL., 200 tons, Grove Street pier shed, to Frederick Steel Co.

OAKLAND, 115 tons, school, and a hotel in San Francisco, to Frederick Steel Co.

MERCED, CAL., 220 tons, hotel, to Badt-Falk Co.

SEATTLE, WASH., 100 tons, Providence Hospital, to Pacific Coast Steel Co.

WALLA WALLA, WASH., 100 tons, high school, to Northwest Steel Rolling Mill Co.

Reinforcing Bars Pending

Inquiries for reinforcing steel bars include the following:

CAMP DEVENS, MASS., 500 tons, two battalion buildings, bids to be opened this week.

EAST BOSTON, 475 tons, Border Street outlet; C. & R. Construction Co., general contractor.

BUFFALO, 100 tons, Annunciation School; Mortimer Murphy, architect.

BUFFALO, 140 tons; substructure for bascule bridge for Bailey Avenue; bids in Nov. 1.

BUFFALO, 100 tons, Humboldt branch of Y. M. C. A.; general contract awarded.

CINCINNATI, 100 tons, building for Sisters of the Precious Blood.

CHICAGO, 500 tons, factory building for James S. Kirk & Co.

CHICAGO, 100 tons, field houses for the Board of Education.

CHICAGO, 300 tons, apartment building at 2107 Sheridan Road; K. M. Zitzhun, architect.

CHICAGO, tonnage not stated, Schedd Aquarium; R. C. Wieboldt & Co., general contractors.

CHICAGO, 250 tons, store and office building, corner of Milwaukee and Kimball Avenues; Rissman & Hirschfelt, architects.

CHICAGO, 400 tons, Guyon's apartment building; Jens Jensen, architect.

ST LOUIS, 400 tons, addition to factory of Missouri Portland Cement Co.

SACRAMENTO, CAL., 128 tons, culverts near Stockton; bids in.

SACRAMENTO, 104 tons, bridge near Lamoine; bids in.

SAN FRANCISCO, 100 tons, loft building at Fremont and Howard Streets; bids Nov. 3.

Sulphur Prints Made in a New Way

Both Sulphur and Phosphorus in Steel Detected by a Simple German Method Improved for Commercial Use

A SUGGESTED new method for making sulphur prints is found in the issue of *Stahl und Eisen*, April 14, 1927. The authors are Dr. H. J. van Royen and Dr. E. Ammerman, both connected with the Hoerde plant of the Vereinigte Stahlwerke A. G., a rather new consolidation closely corresponding with our United States Steel Corporation.

The making of the so-called sulphur prints is a widely used method of carrying out macroscopic examination of steel. The method used here was originated by Baumann, and the authors would prefer to call it the Baumann print. No description of the method is needed, as it is well known.

Another method, not so well known, was originated by Heyn and Bauer. The suitably prepared steel section is covered with silk, moistened with a hydrochloric acid solution of $HgCl_2$ (10 gm. $HgCl_2$, 20 c.c. HCl of specific gravity 1.124, and 100 c.c. H_2O). The contact is maintained from four to five minutes. The sulphide inclusions generate H_2S, which forms black sulphide of mercury and adheres to the silk. The phosphide inclusions form phosphine which gives a lemon yellow precipitate with the mercury salt. A distinction can be made, therefore, between the sulphide and phosphide inclusions.

In the case of the Baumann print, however, the phosphide inclusions give a dark colored precipitate. The Baumann, or ordinary sulphur, print gives a good indication of the segregation conditions present in the steel, but exaggerates the distribution and amount of sulphur.

After further discussion of this question, the authors reach the conclusion that the Heyn and Bauer method is the only one free from error, and they develop a method of carrying it out commercially. In their first tests ordinary photographic paper was "fixed" in hyposulphite solution, thoroughly washed, and the resulting gelatine paper soaked for two minutes in the Heyn-Bauer solution given above, then applied to the surface of the steel. After removal, the excess of dark colored precipitate was gently reduced with a cotton-wool pad under water and the print washed in water for an hour. The reactions are the same as with the original Heyn-Bauer method using silk. The sulphide inclusions give a black precipitate while the phosphide inclusions give a clear yellow coloration.

In order to make the process simpler, the gelatine paper prepared as above was saturated with $HgCl_2$ solution and dried. Then all that was necessary was to soak in dilute HCl solution before use. This gave splendid results. Also one of the commercial companies, Bayer of Leverkusen, prepared gelatine paper for them. This was soaked in the Heyn-Bauer solution, given before, for 2 min. and then used with good results.

The original article reproduces some of the results, which are clear and very interesting. The authors recommend the name sulphur print for their method and Baumann print for the method generally used, and point out that a comparison of both prints is of great value in the examination of any steel.

Prepared from the German by Dr. George B. Waterhouse, professor of metallurgy, Massachusetts Institute of Technology, Cambridge, Mass.

Tonnage Rates for Puddlers and Finishers Reduced

YOUNGSTOWN, Nov. 1.—Tonnage rates for puddlers and finishers in mid-Western mills will be reduced 2½ per cent for November-December from the September-October rate, owing to a decline in the average selling price of bar iron as revealed by the bi-monthly examination. The puddling rate for the final two months of the year will be $11.28 per ton. The average price of bar iron shipped during the past 60 days was 1.90c. per lb., against 1.95c. two months before. In this decline bar iron is following steel bars, which are now quotable at 1.75c. per lb., against 1.85c. earlier in the year.

PERSONAL

L. Kattenburg, president of Handelmy. R. S. Stokvis & Zonen, Rotterdam, Holland, is in this country on a short business trip, with headquarters at the offices of R. S. Stokvis & Sons, Inc., 17 Battery Place, New York.

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O. C. White, until recently vice-president and general manager of the Youngstown Boiler & Tank Co., Youngstown, has taken charge of sales in Michigan for the Sisterville Tank & Boiler Works, Sisterville, W. Va., and will maintain offices at 512 Stephenson Building, Grand Boulevard and Cass Street, Detroit.

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George M. Beard, associated for several years with the Detroit office of the Seneca Iron & Steel Co., Buffalo, has been appointed district sales manager with offices at 2236 General Motors Building, Detroit.

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G. A. Pennock, technical superintendent Hawthorne works, Western Electric Co., Chicago, spoke on "Control and Costs of Building Tools on a Day Work Basis" at a joint meeting on Oct. 28 of the Tri-City Manufacturers Association and the Quad-City section, American Society of Mechanical Engineers, at the Rock Island Arsenal.

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A. L. Culbertson, vice-president and assistant manager; O. D. Rice, engineer in charge of design, service and operations; D. W. Ewalt, sales engineer, and J. W. Barker, construction engineer, all of the Chapman-Stein Furnace Co., Mount Vernon, Ohio, have resigned their former connections and are now affiliated with the Rust Engineering Co., Pittsburgh. Complete reorganization of the furnace department of the Rust company has been made with this division now under the direction of these men. W. C. Buell, formerly connected with the furnace department of the Rust organization, has left its employ.

F. D. French has been appointed sales manager of the Marshall Furnace Co., Marshall, Mich.

—

E. J. Dalton has been elected president of the Yates American Machinery Co., Rochester, N. Y., succeeding W. H. Payne, resigned. R. S. Geddes has been made secretary and treasurer.

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Dr. Zay Jeffries, consulting metallurgist for the General Electric Co. and for the Aluminum Co. of America, will address the Cincinnati chapter of the American Society for Steel Treating, Nov. 3, on new developments in metallurgy.

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F. K. Vial, vice-president Griffin Wheel Co., Chicago, spoke on "The Hot Blast Applied to the Cupola," at the regular monthly meeting of the Wisconsin Gray Iron Research Group, held at the Republican House, Milwaukee, on Nov. 2.

—

H. N. Spicer, of the Dorr Co., New York, has left for Australia, China and Japan for a visit of several months in connection with his company's interests in those countries.

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Victor H. Doyle has been appointed manager of sales in northern California and western Nevada for the Pacific States Cast Iron Pipe Co., Provo, Utah, and has opened offices in the Hunter-Dulin Building, San Francisco.

—

Edwin H. Lundgren, for the past four years general sales manager of the Combustion Engineering Corporation, New York, has been elected vice-president and general sales manager. He has been actively identified with the stoker business since 1912. His association with the Combustion corporation began in 1921, at which time he resigned as vice-president and chief engineer of the Frederick Engineering Co., Frederick, Md., to come to New York. He is a graduate in mechanical engineering of the Swedish Government Technical College.

OBITUARY

HARRY L. BROWN, secretary of the Ohio Brass Co., Mansfield, Ohio, died suddenly at Toledo, Ohio, on Oct. 23, as the result of an operation for appendicitis. He was born at Grand Rapids, Mich., 38 years ago, and after graduation from the University of Michigan, he was engaged in engineering work for the Aurora, Elgin & Chicago Railroad and for the Chicago Telephone Co. before becoming associated with the McGraw-Hill Publishing Co. in 1915.

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GORMAN F. BASSETT, one of the founders of the Bassett-Pressley Steel Co., formerly engaged in the steel jobbing business in Cleveland, died at his summer home in Hyannis, Mass., Oct. 30. He was 77 years of age.

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HAMILTON VOSE, pioneer foundry owner of Milwaukee, died at his home in that city on Oct. 22, aged 73 years. He was born in Albany, N. Y., and went to Milwaukee in 1860, later establishing the firm of Dutcher, Vose & Adams.

—

ADAM W. SLATER, safety inspector Carnegie Steel Co., died at his home in Homestead Park, Pa., Oct. 27. He was born at McKeesport, Feb. 2, 1867, and had been identified with the United States Steel Corporation subsidiaries for almost half a century.

—

W. MARSHALL PAGE, vice-president Copperweld Steel Co., Glassport, Pa., died Oct. 27 at the Pittsburgh Athletic Association, where he made his home. He was 46 years old and had been identified with the Copperweld company since the close of the World War, in which he served in the engineering corps and in the chemical warfare division, holding the rank of major.

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EDWARD BROWNING, secretary Belmont Iron Works, Philadelphia, died Oct. 22 at his home in Devon, Pa., aged 41 years. He was a graduate of the Sheffield Scientific School, Yale University.

Valley Output of Sheets and Strip Gains

YOUNGSTOWN, Nov. 1.—Production schedules of mid-Western iron and steel companies operating in this area indicate an average operation of 60 per cent of steel ingot capacity. In sheets and strips there has been an appreciable increase in new business. Of 127 sheet mills, 101 are scheduled, against a low several months ago of 50 mills; hot-strip mill production is up, due in part to new buying stimulated by price recessions of recent weeks. On the other hand, merchant steel bar buying has declined considerably. Of 20 pipe mills in this district, 15 are under power.

The plant and assets of the Struthers Furnace Co. are scheduled to be sold Wednesday of this week at sheriff's sale, and there are a number of bidders for the property. Some opposition has developed to a reorganization plan proposed by H. W. Grant, receiver, and W. C. Holzworth, who has been acting as manager for the receiver. The company's merchant stack at Struthers, Mahoning County, Ohio, has been idle most of the year.

Upholds Rail-and-Water Rates on Steel from Birmingham to Texas

WASHINGTON, Nov. 1.—Passing upon a complaint by the Atlantic Steel Co., Atlanta, Ga., Examiner C. J. Peterson, in a report made public yesterday, recommended that the Interstate Commerce Commission finds not unduly prejudicial or preferential the disparity between rates on iron and steel articles, in carloads, from Atlanta and Birmingham, Ala., to destinations in Texas and Louisiana by rail to Birmingport, Ala., and via the Mississippi-Warrior Service to New Orleans or Baton Rouge, La., thence by rail.

Strong Steel for Long-Span Bridges

A symposium on "Strong Steels for Modern Long-Span Bridges" is to feature the program for the November meeting of the New York Chapter of the American Society for Steel Treating, Monday evening, Nov. 14, in the rooms of the Merchants Association of New York, Woolworth Building. The chief address will be made by Leon Moisseiff, chief consulting engineer of the new Hudson River bridge, whose topic will be "The Engineer's Requirements." This address will be followed by 15 min. discussions as follows:

"Making Acid Steel for Bridges," by Mr. Boynton of the Roebling company, Trenton; "Making High-Tensile (220,000 lb. per sq. in.) Suspension Cable Wire," by Mr. DeForest, Page Steel & Wire Co.; "Silicon Steel Used in Philadelphia-Camden Bridge," by H. T. Morris, Bethlehem Steel Co.; "Heat-Treated Eye Bars," by Mr. Edwards or Mr. Larsen, American Bridge Co., and the "Inspector's Job," by J. C. Ogden, R. W. Hunt & Co., New York. A summing up of the evening's discussion will be made by F. E. Schmitt, associate editor *Engineering News-Record*.

At the October meeting of the chapter, held on Oct. 10, an interesting industrial motion picture entitled "The Age of Speed" was presented by Alphonse O. Rousseau, sales engineer of the Norton Co., Worcester. The picture illustrates the developments which have been made in speed transportation, communication and in various types of production machinery and shows the indispensable part which has been played by grinding wheels and grinding machinery in making this development possible. Methods of manufacturing grinding wheels of various types are also included. Mr. Rousseau, at the close of the presentation, elaborated some of the details and answered many questions.

Net income of the M. A. Hanna Co., Cleveland, in the September quarter, amounted to $417,794, after interest, depreciation, depletion and Federal taxes, equivalent after allowing for dividends on first and second preferred stock to 54c. a share on the 291,844 shares of no par common stock. This compares with $325,125 or 23c. a share in the preceding quarter and with $423,004 or 55c. a share in the third quarter of 1926. Net income for the first nine months of 1927 amounted to $776,669, as compared with $534,639 in 1926 and with a deficit of $292,290 in 1925.

Industrial Finances

Fairbanks, Morse & Co., Chicago, for the quarter ended Sept. 30, reported net income of $527,477, after all charges, equivalent after preferred dividends to $1.21 a share on the common stock. This compared with $718,587 or $1.44 a share in the preceding quarter and with $813,030 or $1.86 a share in the September quarter of 1926. For the first nine months of the present year income amounted to $1,390,150 or $2.74 a share, as against $2,446,102 or $5.58 a share in the first three quarters of 1926.

The American Brown Boveri Electric Corporation, New York, has announced the following income figures: for the quarter ended Sept. 30, $207,657; for the quarter ended June 30, net loss of $45,586, and for the quarter ended Sept. 30, 1926, net income of $492,680.

The Allis-Chalmers Mfg. Co., Milwaukee, in the September quarter earned net profits of $776,709, compared with $831,987 in the preceding quarter and with $925,662 in the September quarter last year. In the first three quarters of this year the company earned $2,458,860, as against $2,580,221 in the corresponding period last year.

The General Refractories Co., Pittsburgh, in the three months ended Sept. 30, earned $273,763, as against $268,228 in the corresponding period of last year. Nine months net in 1927 amounted to $1,193,975, as compared with $857,932 last year.

Net income of the General Railway Signal Co., Rochester, N. Y., for the first nine months of the year, totaled $2,488,827, as against $2,745,381 in the first three quarters of 1926.

The National Cash Register Co., Dayton, Ohio, in the nine months ended Sept. 30, had net income of $4,672,008, as against $4,745,974 in the first nine months last year.

The Transue & Williams Steel Forging Co., Cleveland, reports net earnings after taxes and other charges in the September quarter of $38,844, as compared with a deficit of $56,626 in the corresponding quarter last year. Directors of the company have declared a dividend of 25c. a share on the common stock.

The National Acme Co., Cleveland, in the September quarter, had net income of $42,926 after charges, but before taxes, equal to 8c. a share on the capital stock outstanding. This compares with $44,624 or 9c. a share in the preceding quarter and with a net loss of $40,223 in the third quarter of last year.

The Eaton Axle & Spring Co. Cleveland, earned $162,892 after interest and other expenses but before Federal taxes in the quarter ended Sept. 30. In the corresponding quarter last year the company earned $303,542.

The Otis Elevator Co., New York, in the nine months ended Sept. 30, reports net income of $4,059,113 after all reserves and charges. This compares with $4,027,161 in the first three-quarters of 1926.

The Munnsville Plow Co., Munnsville, N. Y., has filed a schedule in bankruptcy showing liabilities of $100,000 and assets of $75,448.

The Yale & Towne Mfg. Co., Stamford, Conn., reports net earnings in the September quarter of $591,216, compared with $719,479 in the similar quarter last year.

COMING MEETINGS

November

American Institute Mining and Metallurgical Engineers. Nov. 2 to 4. Open-hearth committee meeting, Statler Hotel, Detroit. H. Foster Bain, 29 West Thirty-ninth Street, New York, secretary.

Automotive Accessories Association. Nov. 7 to 12. Second annual show, Armory at Sixteenth Street and Michigan Avenue, Chicago. William B. Levey, 1107 Standard Life Building, Pittsburgh, manager.

Industrial Commission of Ohio. Nov. 9 and 10. Safety conference and exhibit, Columbus, Ohio. J. M. Woltz, Youngstown Sheet & Tube Co., Youngstown, chairman of metal section.

American Society of Mechanical Engineers. Nov. 10. Iron and steel division, Youngstown, Ohio. Calvin W. Rice, 29 West Thirty-ninth Street, New York, secretary.

National Founders Association. Nov. 16 and 17. Thirty-first annual meeting, Hotel Astor, New York. J. M. Taylor, 29 South LaSalle Street, Chicago, secretary.

International Acetylene Association. Nov. 16 to 18. Stevens Hotel, Chicago. A. Cressy Morrison, 30 East Forty-second Street, New York, secretary.

URGES BETTER DISTRIBUTION

Inefficient Selling Due to Lack of Statistics—Surveys of Distribution Initiated

WASHINGTON, Nov. 1.—"With some minor deductions, approximately the whole of the stupendous sum of $89,000,000,000 was spent last year in the United States for commodities and services. Just how or where the money went no one knows."

This statement was made by Dr. Julius Klein, director of the bureau of foreign and domestic commerce, Department of Commerce, on Wednesday night of last week before the American Association of Advertising Agencies, in pointing out how the science of distribution has failed to keep pace with improved manufacturing methods. Doctor Klein deplored the millions squandered in inefficient selling efforts, in chasing what he described as the "mirage of a national market" for commodities best sold locally, or in following the "phantom of the full order book at all costs." Assisting business in solving the present day problems of distribution, he asserted, is one of the most important functions which now confront the economic service units of the Government. In Doctor Klein's opinion, the big job before the Government is to work with business in considering the many vitally important problems of distribution efficiency and in attacking them with the more modern weapons of scientific analysis so that maximum benefits may accrue to the consumer as well as to the producer and distributer.

On the subject of manufacturing processes, the speaker said that enormous strides have already been made in increasing efficiency. Recent studies of census data, he said, show that the average employee in 1925 produced 50 per cent more output in volume than his counterpart did 25 years ago. Between 1923 and 1925 the output of American factories showed an increase in value of $2,500,000,000 with a decrease in personnel.

"Unfortunately, efficient manufacturing has not had a counterpart in that other great phase of business which we call distribution," said Doctor Klein. "We have no yardstick by which we can measure progress in distribution as we can in manufacturing, because no fundamental census of the distribution agencies has been compiled. Incredible as it may seem, we are lacking almost entirely in any accurate, comprehensive information as to the largest single item in our whole commercial activity, namely, the volume of wholesale or retail trade, or as to the character of the outlets through which various commodities are handled.

"The experimental censuses of distribution in a dozen cities scattered throughout the United States, conducted by the census bureau last summer, represent the first official step in this direction. They have already revealed considerable information which will be of vital interest, not only to the wholesalers and retailers but to advertisers, shippers and others.

Market research today was described as an almost virgin field which is being rapidly cultivated "and in this movement the advertising agencies are taking a very important part. They realize that sound advertising is one of the most potent stimulators of business; but in order to be sound, in order that this profession might continue to merit the confidence of its client its services must be based upon accurate appraisals, not simply circulation estimates, but effective market outlets. These facts can be ascertained only by thorough studies, not merely of population figures, nor even of 'potential buying power' but of the actual cost of serving the given market after its demand for the given merchandise has been aroused. That factor of the cost of distribution may throw the whole campaign into the discard as so much waste effort."

Doctor Klein said there are certain phases of market research in which the Government can properly take part and can supplement the work of private agencies in such a way as to make their efforts more effective. In this connection he announced that the bureau is about to release the first of a series of regional commercial surveys which attempt to determine the basic commercial attributes, the factors affecting distribution, and the actual status of the buying power of the various economic areas of the country.

"No far-sighted market planning in these days of multiple domestic trade risks and highly sensitive reactions from one remote trading center to another can be complete without some careful consideration of foreign outlets," said Doctor Klein. "There is a wide and useful field for the advertising expert who will help to project American advertising methods and standards into our foreign markets. Dollar for dollar a given sum spent for intelligent advertising of certain commodities in certain markets overseas might be made to yield larger returns than are being achieved by the same expenditure in domestic advertising of the same product. It is a subject worthy of your serious consideration and the Department of Commerce is prepared to have its staff, both abroad and in Washington, assist in the collection of helpful facts on the subject."

Simplified Practice Recommendations Reaffirmed for Steel Sheets

WASHINGTON, Nov. 1.—Simplified practice recommendations for sheet steel, terne plate, eaves trough and conductor pipe, files and rasps and tinware, galvanized and japanned ware were reaffirmed for another year at revision conferences held during October, according to the division of simplified practice, Department of Commerce. The sheet steel recommendation was reaffirmed by the industry for the fourth year, effective Jan. 1, 1928. The revision conference reported that the average adherence to the sheet steel portion of the recommendation was 85 per cent. The original recommendation for sheet steel reduced the varieties from 1819 to 263, or 85 per cent. The terne plate conference changed the title of its recommendation to "roofing ternes" in order to eliminate any confusion which might arise from the fact that terne plate sheets are used for other purposes than roofing. The consumption of terne plate for roofing is small compared with the total volume which goes into other manufactured products. This recommendation was reaffirmed for a period of one year, from Jan. 1, 1928. The original recommendation reduced the number of weights from nine to seven. The eaves trough and conductor pipe recommendation was reaffirmed by the industry for the third year, effective Jan. 1, 1928. The industry reported an average adherence to this recommendation of 92 per cent. The original recommendation reduced the varieties from 21 to 16, or 24 per cent.

The files and rasps recommendation was reaffirmed for the third year. This action covers a period of one year, effective Nov. 1. The original recommendation reduced the stock varieties from 1351 to 496, an elimination of 65 per cent. The average adherence to the recommendation was reported to be 93 per cent. The tinware, galvanized and japanned ware recommendation was reaffirmed for a period of one year, effective Jan. 1, 1928. The report stated that the average adherence to this recommendation was 92 per cent. The original recommendation reduced the varieties from 1154 to 873, or 24 per cent.

To Consider Simplification of Marine Hardware

Marine hardware manufacturers and distributers at a recent conference in Atlantic City appointed a committee to survey the entire marine hardware line with a view to preparing a simplified practice program in cooperation with the Division of Simplified Practice, Department of Commerce. The committee consists of George C. Soule, Marine Hardware Equipment Co., South Portland, Me., chairman; C. F. Herrmann, Wilcox, Crittenden Co., Middletown, Conn., and D. S. Laughlin, Thomas Laughlin Co., Portland, Me.

At the semi-annual meeting of the Rail Steel Bar Association in New York, Oct. 27 and 28, the members reviewed a recently completed motion picture film showing each step in the manufacture of rail steel reinforcing bars. Several copies of the film will be released immediately for exhibition to engineering and architectural societies and universities. The secretary is H. P. Bigler, 228 North La Salle Street, Chicago.

British Seek Efficiency by Mergers

Welsh Mills May Meet American Competition in This Manner—Germany Exceeds Pre-War Steel Output—Continent Imports American Iron

(*By Cable*)

LONDON, ENGLAND, Oct. 31.

PIG iron is quieter with Continental competition increasing in the Scottish and Middlesbrough districts. Cleveland producers are moderately well situated, with stocks reduced and the present limited output being absorbed. Sales of hematite, however, are restricted and supplies are abundant. Foreign ore is still quiet.

The general aspect of the heavy steel industry is disquieting because of the impossibility of reducing costs as a result of the determination to maintain the standard of living unimpaired, added to which is the crippling burden of imperial and local taxation. It is believed in some quarters that certain important plants can hardly continue the struggle much longer. A suggested solution to the problem is the amalgamation of efficient low cost units into geographical groups, abandoning high cost plants to their own devices.

Demand from domestic shipyards for steel is moderate, but export sales are negligible except for Colonial Government contracts. The Clyde shipbuilding output in October was 20 vessels of 72,600 tons.

Welsh tin plate works are reported to be alarmed at the increasing foreign competition and the rapid American progress toward reduction of costs. Frank Rees, managing director of the Llanelly Steel Co., Carmarthenshire, has officially announced that an important combination of mills will take place in Wales. This is believed to involve the complete merger of all Welsh steel bar and tin plate works. A committee has already been appointed to study the question and the works are now examining the proposals.

Such a merger would probably be difficult, but it is expected that some of the smaller works may be willing to abandon their individual struggle and enter into a combination. Others, however, are not prepared to lose their identity in a corporation unless they receive a very high compensation. The Elba Steel Works is obtaining increased output from new mills, but labor is hostile toward the new methods.

Tin plate consumers are showing more interest in buying at low prices and further moderate sales have been made at 17s. 6d. ($4.25) per base box, f.o.b. works, port, which is claimed to figure about 1s. (24c.) per box less than actual cost, when based on use of Welsh steel and about 9d. (18c.) per base box less than cost when foreign sheet bars are used.

Bombay is buying small lots of galvanized sheets, but the Calcutta market is idle and, being heavily overstocked, prices are easy. Japan has purchased a few small orders of black sheets, but demand is generally quiet.

Continental iron and steel markets are quiet generally, although export inquiry is broadening. Producers, however, are not keen sellers at the current low prices. British consumers are buying but little.

Continental pig iron producers are disturbed by the continuous arrivals at European ports of small tonnages of American pig iron, which it is suggested are for special purposes. The French production in September was 761,000 tons of pig iron and 693,000 tons of steel ingots. At the end of September there were 141 furnaces in blast.

German Home Demand Large—Pre-War Steel Output Reached

(*By Cable*)

BERLIN, GERMANY, Oct. 31.

Prices of the Pig Iron and Steel syndicates for November are unchanged and the export rebates paid by the latter show no revision. The market is very active and rolling mills have booked orders far in excess of their syndicate quotas. Some companies are unable to deliver bars in less than four to five months. Domestic orders for machinery have increased, but export purchasing has declined.

The only market showing sharp competition is in thin sheets, which are not controlled by a syndicate. Agreement for formation of an International Wire Rod Cartel has been ratified.

In a recent speech, Director Voegler of the Vereinigte Stahlwerke A. G. declared that Germany's pres-

British and Continental European prices per gross ton, except where otherwise stated, f.o.b. makers' works, with American equivalent figured at $4.86 per £ as follows:

Durham coke, del'd.	£0 18s.				$4.37		
Bilbao Rubio ore†	1 1	to £1	1¼s.		5.10	to	$5.16
Cleveland No. 1 fdy.	3 10				17.01*		
Cleveland No. 3 fdy.	3 7½				16.40*		
Cleveland No. 4 fdy.	3 6½				16.16*		
Cleveland No. 4 forge	3 6				16.04*		
Cleveland basic (nom.)	3 15	to	3 15½		18.23	to	18.35
East Coast mixed	3 12				17.50		
East Coast hematite	3 12½				17.62		
Rails, 60 lb. and up	7 15	to	8 0		37.67	to	38.88
Billets	6 0	to	6 10		29.16	to	31.59
Ferromanganese	13 0				63.18		
Ferromanganese (export)	11 10	to	12 0		55.89	to	58.32
Sheet and tin plate bars, Welsh	5 7½	to	5 15		26.12	to	27.95
Tin plate, base box	0 17½	to	0 18		4.25	to	4.37
Black sheets, Japanese specifications	13 15	to	14 0		66.83	to	68.04
					C. per Lb.		
Ship plates	7 12½	to	8 2½		1.65	to	1.76
Boiler plates	10 10	to	11 0		2.28	to	2.39
Tees	8 2½	to	8 12½		1.76	to	1.87
Channels	7 7½	to	7 17½		1.60	to	1.70
Beams	7 2½	to	7 12½		1.55	to	1.65
Round bars, ¾ to 3 in.	7 12½	to	8 2½		1.65	to	1.76
Steel hoops	10 10	to	11 0		2.28	to	2.39
Black sheets, 24 gage	10 5	to	10 10		2.22	to	2.28
Galv. sheets, 24 gage	13 10	to	14 0		2.93	to	3.03
Cold rolled steel strip, 20 gage, nom.	14 0	to	14 5		3.03	to	3.09

*Export price, 2½s. less for 500 tons or more.
†Ex-ship, Tees, nominal.

Continental Prices, All F.O.B. Channel Ports

(Per Metric Ton)

Foundry pig iron: (a)							
Belgium	£2 19s.	to	£3 0s.		$14.34	to	$14.58
France	2 19	to	3 0		14.34	to	14.58
Luxemburg	2 19	to	3 0		14.34	to	14.58
Basic pig iron:							
Belgium	2 17	to	2 18		13.85	to	14.09
France	2 17	to	2 18		13.85	to	14.09
Luxemburg	2 17	to	2 18		13.85	to	14.09
Coke	0 18				4.37		
Billets:							
Belgium	4 4	to	4 5		20.41	to	20.66
France	4 4	to	4 5		20.41	to	20.66
Merchant bars:					C. per Lb.		
Belgium	4 15				1.05		
France	4 15				1.05		
Luxemburg	4 15				1.05		
Joists (beams):							
Belgium	4 10	to	4 12		0.99	to	1.02
France	4 10	to	4 12		0.99	to	1.02
Luxemburg	4 10	to	4 12		0.99	to	1.02
Angles:							
Belgium	4 13				1.03		
⅛-in. plates:							
Belgium (a)	6 5	to	6 6		1.38	to	1.39
Germany (a)	6 5	to	6 6		1.38	to	1.39
⅜-in. ship plates:							
Belgium	6 0	to	6 1		1.32	to	1.33
Luxemburg	6 0	to	6 1		1.32	to	1.33
Sheets, heavy:							
Belgium	6 1				1.33		
Germany	6 1				1.33		

(a) Nominal.

ent productive capacity for steel is 18,000,000 tons annually, or the same as the pre-war output, which came from a larger area.

A spokesman for the Metal Wares Congress has demanded abolition of all import duties on steel, but the official commission now studying the tariff favors their retention.

British Rebates Affect German Plate Sales

HAMBURG, GERMANY, Oct. 16.—The British plan of giving rebates to steel consumers dealing exclusively with British mills has been viewed with interest by Continental producers. In some quarters it was welcomed as a sign that British mills were making an effort to aid themselves instead of urging a protective policy.

With six weeks elapsed since inauguration of the rebate plan, something of its effect upon exports of Continental material to the United Kingdom can be seen. Merchants dealing with British consumers are unanimous in claiming that its effect on their trade has been negligible, as far as bars and beams are concerned, as the British merchants of these products in most cases refused to become party to the rebate agreement. Their refusal is apparently based on the requisite that adherents must give the names of their customers and because the signer may not purchase from any United Kingdom producer other than those who signed the agreement.

In plates, however, there has been a decided reduction of orders, especially for tested plates. These are directly affecting German mills, as they have been large sellers of plates to the United Kingdom, although their sales of semi-finished steel were small. The reason given for this decline is the small difference between the British price with rebate deducted and the current German delivered quotation. As a result, the German mills are contemplating a reduction of the price for tested ship plates for export to the United Kingdom. The present prices for 3/16-in. plates and heavier, German Lloyd tests, are £6 12s. 6d. (1.45c. per lb.) for large lots and £6 15s. per ton for small lots. A reduction of 5s. ($1.21) per ton is contemplated.

Russian Colliery Contract Placed in United States

HAMBURG, GERMANY, Oct. 16.—According to the *Pravda* in Moscow, the South Russian Steel Co. has awarded a contract to the Allen & Garcia Co., Chicago, for the entire equipment of 12 collieries in the company's coal fields, ten of which are in the Ukraine and two in the Ural district. Work of installation is to be completed within five years and the value of the contract is estimated at about 125,000,000 rubles. With the ruble quoted at 1.60 m., this would amount to 200,000,000 m., or $47,600,000. The coal output of these 12 collieries, it is estimated, will be about 30,000 tons a month.

Continental Bolt Head Differs From American

HAMBURG, GERMANY, Oct. 16.—Carriage bolts and nuts, which sell in large quantities to various foreign markets, are purchased in relatively few countries with the customary American head. Only South Africa, Canada and sometimes Australia accept the American type bolts and nuts and these markets also purchase the Continental type. The head of the European made bolt is about ⅓ greater in surface than the American, but is more flattened than the American type. Buyers in the habit of using this type naturally are not inclined to consider American offers, even though the price may be satisfactory.

Imports of pipes and tubes into Germany are increasing. The tube mills are negotiating with importers and merchants in an effort to make an agreement by which all importers when purchasing German tubes would obtain a considerable extra discount on all sales, subject to a promise not to deal further with foreign makers.

FRENCH BUSINESS LIGHT

Consumers Still Awaiting Formation of International Selling Syndicates

PARIS, FRANCE, Oct. 21.—The tendency of the iron and steel markets toward improvement was arrested by the report that negotiations for the establishment of separate selling syndicates for bars and beams had not been successful, but the expected reaction to lower prices has not developed. Producers, in an effort to stimulate business, have been pointing out that this is a very desirable time to purchase. The franc is fairly stable, showing no evidence of further decrease in value, money is easy, fuels have reached a minimum based on present wages to the miners and the cost of living, despite a slight decrease, is still high enough to prevent any reductions of wages. With no prospect of lower general costs or taxes, it is claimed that lower selling prices within the next year are not probable. Furthermore, it is argued that there is the possibility of an increase in export prices, which might be reflected in the domestic market, the higher export level coming with institution of selling syndicates for bars and beams, which will probably be established eventually.

Pig Iron.—Producers of phosphoric foundry iron have decided to maintain prices unchanged. There was some pressure for a further reduction but it was pointed out that the lowering of prices last month had no appreciable effect on the market. A total of 30,000 tons was placed at the disposal of domestic foundries for November. Hematite iron producers also decided to maintain present prices on forge and foundry grades but reduced the price of 18 to 20 per cent spiegeleisen to 20 fr. (78c.) per unit of manganese. Allotments of hematite for domestic consumption were set at 30,000 tons for November, 15,000 tons for December and 5000 tons for January shipment. Export prices are not particularly firm as a result of the small demand. At the recent meeting of French, Belgian and Luxemburg producers it was decided to reduce the price of No. 3 foundry sold in the Belgian market.

Semi-Finished Material.—The domestic market is quiet and export business is confined to small lots. Prices show a slight undertone of weakness. Blooms are quoted at £3 17s. to £4 ($18.69 to $19.44) per ton, f.o.b. Antwerp. Billets are quoted at £4 2s. 6d. to £4 4s. 6d. ($20.05 to $20.63) per ton, f.o.b. Antwerp.

Finished Material.—It was believed in many quarters that the announcement, that negotiations for formation of selling syndicates for bars and beams had been postponed, would cause a sudden weakness in prices, but this has not been the case. Demand, however, is extremely light. Purchasing of beams is unusually small, partly because of the apparent belief of buyers that there is no prospect of an early establishment of selling syndicates and partly as a result of the inroads on structural steel construction by reinforced concrete. This domestic depression in finished products is also evident in the export markets. On the Brussels Bourse, angles to American specifications are quoted at £4 15s. per gross ton (1.03c. per lb.), open-hearth bars at £4 19s. per gross ton (1.076c. per lb.), deformed steel bars of structural grade at £4 19s. per gross ton (1.076c. per lb.) and American section beams at £4 18s. per ton (1.065c. per lb.). Hoops are nominally £5 12s. per gross ton (1.218c. per lb.) in coils and wire rods, 5 to 10 mm. in diameter, £5 10s. per gross ton (1.196c. per lb.), all f.o.b. Antwerp.

Sweden Stops Exports of Malleable Scrap

WASHINGTON, Nov. 1.—The exportation of malleable scrap iron from Sweden has been forbidden until Feb. 29, 1928, by a recent decision of the King and his cabinet, according to a report to the Department of Commerce by John Ball Osborne, consul-general. It probably will depend on developments in the Swedish iron and steel industry whether the prohibition will be extended. Exports of scrap from Sweden during the eight months ended with August of the present year totaled 30,444 metric tons, which compares with 5448 tons and 8716 tons respectively for 1926 and 1925.

SOME IMPROVEMENT IN JAPAN

Black Sheets and Tin Plate, However, Sell At Less Than Replacement Costs

Several metal manufacturing companies in Japan were declared bankrupt in September, according to the monthly metal market report of A. Cameron & Co., Ltd., Kobe, Japan. Among these was the Dog Galvanizing Co., one of the largest galvanizing plants in the Osaka district. It was capitalized at 350,000 yen and showed liabilities of 400,000 yen.

"The closing down of these metal merchants," says the report, "is, of course, part of the general cleaning up that is necessary before any improvement in trade can be expected. As each concern closes, there is a lot of merchandise thrown on the market, but each month sees fewer companies being forced into bankruptcy and distinct signs of an improvement in general conditions in the country are evident."

As the season of demand for black sheets has set in, the report continues, there has been some improvement in the consumption of this commodity during September. However, the substantial orders for sheets usually received at this time from China and the northern districts of Japan have been absent, which has been a disappointing factor in the market. A few stockholders have been clearing their stocks at a price below the market and one or two wholesale merchants in need of cash sold their holdings at low prices, taking advantage of the revival in demand. Present market prices are estimated to be about 1 sen per sheet under replacement cost. Announcement of the bankruptcy of one of the largest galvanizing plants, the Dog Galvanizing Co., brought out some strength in the galvanized sheet market, which was reflected in black sheet prices. September quotations on American "Eagle" brand light gage sheets were about 75 sen (35c.) per sheet with British "Raven" and "Globe" brands at about 74 sen (33c.).

Expecting a revival in demand for tin plate, members of the tin plate exchange in Osaka agreed to advance prices, but contrary to expectation the local demand was small and wholesale merchants have been selling small quantities to consumers at prices slightly under the market. The market, however, is fairly well maintained. American primes, 170 lb. boxes are quoted at about 23 yen ($10.70) per box and 100 lb. boxes at 13 yen ($6.05) per box. British primes, 170 lb. boxes have ranged from 21.50 to 22.50 yen ($10 to $10.47) per box and 100 lb. boxes from 12.30 to 13 yen ($5.72 to $6.05) per box.

Austrian Steel Business Shows Improvement

VIENNA, AUSTRIA, Oct. 19.—Revival of domestic purchasing of iron and steel has brought a decided improvement in business. The latest employment report lists 150,000 unemployed compared with 275,000 on March 1. The new tariff schedule, which has been approved in committee, materially increases duties on iron and steel, including tubes, metal sheets and motor cars.

Current orders on the books of steel companies are the largest for several years. The Alpine Montan A. G. is booked to 75 per cent of capacity compared with 40 to 50 per cent in 1926. Exports have increased slightly as a result of the decline in competition from German mills. Domestic manufacturers have been aided somewhat by the rebates for material going into manufactures for export, similar to the German system.

Production of iron, steel and ore in the second quarter was larger than in the first, as follows:

	First Quarter (Metric Tons)	Second Quarter (Metric Tons)
Iron ore	296,981	400,318
Pig iron	96,927	112,870
Steel ingots	127,929	138,277
Rolled products	90,530	97,785

The German Wire Rope Syndicate has concluded an agreement with Belgian and Dutch makers of wire rope by which sale to all foreign markets will be controlled.

EUROPEAN HOOPS IMPORTED

Demand for Bars and Shapes Still Small—Japanese Gas Company Buys American Pipe

NEW YORK, Nov. 1.—Consumers are beginning to show greater interest in purchasing imported steel, but orders are still small. Recently there has been a little activity in hoops and bands, particularly the former. German hoops, some of which have been sold here, are quoted at about 2c. per lb., c.i.f. Atlantic port, for No. 18 gage, 1 in. wide. Some French and Belgian hoops are reported to have been offered at 5c. to 10c. per 100 lb. less than this.

Buying of steel bars is light, although importers are able to quote 1.65c. to 1.70c. per lb., base, for plain steel bars of Thomas grade, with structural material offered at 1.55c. to 1.65c. per lb., c.i.f. port. It is reported that one importer has been able to purchase Belgian bars at less than 1c. per lb., f.o.b. Antwerp, thereby reducing the duty payment for entry into the United States to 20c. per 100 lb. instead of the usual duty of 30c. per 100 lb.

Exports to Far East Still Small

Although there has been some inquiry from Japanese merchants and consumers for light gage black sheets, no purchases have been made from American mills and but few orders have apparently been booked by British makers, despite their lower quotations. Among recent purchases by Japanese consumers is 2100 tons of gas pipe by the Tokio Gas Co., understood to have been divided between two Japanese exporters in the United States. The Tokio municipality 140-lb. guard rails are not yet reported placed.

France Suspends Discriminatory Tariff Against United States

WASHINGTON, Nov. 1.—The belated action of the French Government in agreeing to suspend discriminatory tariff rates against the United States has undoubtedly relieved the tense situation which existed between the two countries over the tariff question. But to say that it has settled the problem satisfactorily is entirely another matter, for it has not done so. As yet France has not indicated that it will give the United States most-favored-nation treatment, and until that is done the situation remains serious and puts this country in the position of having to keep ready at hand the retaliatory features of the tariff act, particularly Section 317, which provides an increase of 50 per cent ad valorem against goods from any country which discriminates against the United States, or even an embargo.

France's delay in suspending the maximum rates which it had put into effect against the United States while giving minimum rates to Germany and other European countries was, to say the least, considered a diplomatic blunder. It is believed France finally realized its error and saw that the United States has at hand and, if necessary, would use weapons which would cause more injury to France, as regretful as that would be, than France could possibly do to the United States.

In the meantime, negotiations between the two countries looking to a commercial agreement will be taken up. Pending their outcome, American products will be given the minimum rates prevailing prior to the enforcement of the maximum rates, except in instances where these rates were raised generally. The United States at no time has objected to the rates themselves. The objection has been primarily to discrimination.

Balance sheets of the steel companies in Germany show that despite greatly increased output, the so-called "social charges" (unemployment insurance, etc.) calculated on a per ton basis are again higher, as a result of new legislative charges. Prior to the war these social charges were about 40c. per ton, but in 1926 they had risen to $1.80 to $2 per ton.

9-Month Import Total Off 34 Per Cent

Meanwhile, Exports Gained 5½ Per Cent—Import Loss Is in Pig Iron—Tin Plate Exports Much Higher

WASHINGTON, Oct. 29.—While both imports and exports of iron and steel products showed a decline in September when compared with August, the former dropping to 58,464 gross tons compared with 68,386 tons, and the latter registering 166,352 tons against 175,636 tons, there is seen a much more striking change in the foreign iron and steel trade when the nine-month period ended with September is compared with the corresponding period of 1926. When the movement is viewed from this phase it is shown that imports made a sharp descent for the nine months of the present year to 571,894 tons, compared with 871,407 tons, a decline of 299,513 tons or 34 per cent, while exports on the other hand rose to 1,664,358 tons, a gain of 87,281 tons, or 5½ per cent.

The greatest decline in imports, both for September and for the nine months, was in pig iron, which dropped from the substantial total of 394,583 tons for the nine months of last year to only 94,449 tons for the nine months of 1927. There also were decreases during the nine months of the present year in imports of such products as ferromanganese, ferrosilicon, scrap, blooms and billets, steel bars and rails and splice bars. On the other hand there were increased imports in such lines as wire rods, hoops and bands, cast iron and steel pipe and structural shapes. The greatest increase was in the last named item, which gained 35,255 tons during the nine-month period, the bulk of this year's shipments coming from Belgium.

The outstanding gain in exports in September when compared with August was in scrap, which represented the largest tonnage of any single product shipped abroad last month, with a total of 30,084 tons. There were decreases in exports of such products as steel bars, plates, black steel sheets, tin plate, structural material, plain and fabricated, and rails. For the nine months ended September there were gains in exports of numerous products, including pig iron, scrap, blooms and billets, tin plate and tubular products, when compared with the corresponding period of last year. Decreases were reflected in steel bars, wire rods, galvanized sheets, hoops and bands, structural material (plain and fabricated) and wire products.

Belgium led as the source of iron and steel products imported in September, providing 14,524 tons, while France ranked second, with 12,957 tons, and Germany third, with 11,697 tons. Belgium was the source of 6997 tons of the 15,639 tons of structural shapes imported; France provided 4005 tons and Germany, 4514 tons. Of the 6076 tons of cast iron imported for the month, 4633 tons was credited to France, 837 tons to Czechoslovakia and 575 tons to Belgium. Soviet Russia was the source of 21,504 tons of the 36,029 tons of manganese concentrates imported in September. Brazil supplied 10,156 tons and British India, 4149 tons.

Canada led by far as the destination of September exports, taking 67,660 tons, while for the nine months ended with September Canada took 631,197 tons,

Imports of Iron and Steel into the United States

(In Gross Tons)

	September		Nine Months Ended September	
	1927	1926	1927	1926
Pig iron	9,169	17,508	94,449	394,583
Ferromanganese*	1,897	1,707	21,111	29,039
Ferrosilicon†	126	818	6,563	8,280
Ferrochrome‡	30	....	412	429
Scrap	3,302	10,910	45,165	59,308
Pig iron, ferroalloys and scrap	*14,524*	*30,943*	*167,700*	*491,639*
Steel ingots, blooms, billets and slabs	841	4,381	9,449	26,727
Iron blooms, slabs, etc.	....	....	....	323
Wire rods	1,328	511	11,415	6,727
Semi-finished steel	*2,169*	*4,892*	*20,864*	*33,777*
Rails and splice bars	2,773	11,401	14,620	54,320
Structural shapes	15,639	13,351	119,660	84,405
Boiler and other plates	24	29	3,248	3,622
Sheets and saw plates	2,451	1,380	12,006	6,629
Steel bars	9,018	8,581	72,465	80,075
Bar iron	162	125	3,158	4,172
Hoops, bands and cotton ties	2,387	2,777	26,389	18,442
Tubular products (wrought)	1,434	1,571	43,158	18,598
Nails, tacks, staples	376	391	4,921	3,613
Tin plate	22	21	980	2,036
Bolts, nuts, rivets and washers	40	11	289	305
Round iron and steel wire	251	276	3,170	2,930
Barbed wire	404	285	3,486	2,616
Flat wire; strip steel	169	162	1,974	2,761
Steel telegraph and telephone wire	1	....	32	121
Wire rope and strand	139	288	1,799	2,156
Other wire	163	101	467	1,430
Rolled and finished steel‡	*35,453*	*40,750*	*311,822*	*288,231*
Cast iron pipe	6,076	8,724	69,350	55,848
Castings and forgings	242	170	2,158	1,912
Total	58,464	85,479	571,894	871,407
Manganese ore*	36,029	18,167	266,826	293,836
Iron ore	224,524	232,360	2,061,028	1,974,342
Magnesite	4,018	4,452	57,542	62,393

*Manganese content.
†Silicon content.
‡Chromium content.

Exports of Iron and Steel from the United States

(In Gross Tons)

	September		Nine Months Ended September	
	1927	1926	1927	1926
Pig iron	3,513	2,173	35,088	16,628
Ferromanganese	5	119	539	524
Scrap	30,084	5,762	175,012	82,021
Pig iron, ferroalloys and scrap	*33,602*	*8,054*	*210,639*	*99,173*
Ingots, blooms, billets, sheet bar, skelp	11,700	10,745	70,723	67,052
Wire rods	881	1,824	11,784	13,326
Semi-finished steel	*12,581*	*12,569*	*82,507*	*80,378*
Steel bars	7,323	11,199	83,289	101,228
Alloy steel bars	292	166	4,028	3,728
Iron bars	126	771	3,482	3,969
Plates, iron and steel	9,780	10,117	103,726	102,901
Sheets, galvanized	10,451	12,865	122,434	130,146
Sheets, black steel	7,189	9,727	125,846	125,708
Sheets, black iron	1,251	1,176	12,828	14,115
Hoops, bands, strip steel	2,253	3,162	33,280	35,810
Tin plate; terne plate	13,484	26,608	202,214	162,935
Structural shapes, plain material	13,366	12,939	106,711	120,100
Structural material, fabricated	4,251	6,674	48,787	63,491
Steel rails	11,897	19,448	135,572	130,810
Rail fastenings, switches, frogs, etc.	1,807	4,491	26,823	32,431
Boiler tubes, welded pipe and fittings	18,024	24,825	206,747	203,506
Plain wire	4,011	1,921	25,841	25,880
Barbed wire and woven wire fencing	4,763	3,825	38,609	43,172
Wire cloth and screening	185	143	1,755	1,513
Wire rope	328	444	3,414	3,663
Wire nails	1,102	900	6,595	9,158
Other nails and tacks	600	636	6,311	6,385
Horseshoes	47	26	394	474
Bolts, nuts, rivets and washers, except track	849	1,221	9,010	10,442
Rolled and finished steel	*113,379*	*153,284*	*1,307,696*	*1,331,505*
Cast iron pipe and fittings	2,092	2,563	20,015	25,435
Car wheels and axles	1,802	3,953	13,828	13,847
Iron castings	892	753	8,752	7,112
Steel castings	387	373	5,723	6,082
Forgings	277	270	3,768	2,260
Castings and forgings	*5,450*	*7,912*	*52,986*	*54,736*
All other	1,340	1,152	11,435	11,585
Total	166,352	182,071	1,664,358	1,577,077

against 630,741 tons for the corresponding period of last year. Japan ranked second as consumer of American iron and steel in September, as well as for the two nine-month-periods, taking 17,825 tons, 296,827 tons and 181,380 tons, respectively.

Of the 4928 tons of casing and oil line pipe exported in September, Venezuela took 976 tons; Peru, 944 tons; British India, 752 tons; Argentina, 549 tons; Dutch East Indies, 541 tons and Colombia, 309 tons. Of the 7109 tons of black welded pipe exported during the month, Japan took 1702 tons; the United Kingdom, 1024 tons; Philippine Islands, 789 tons; Canada, 637 tons; Cuba, 455 tons; Venezuela, 429 tons and Mexico, 319 tons. Of the 4168 tons of galvanized pipe exported during the month, the Philippine Islands took 1018 tons; Cuba, 585 tons; United Kingdom, 377 tons and Argentina, 339 tons.

Destination of other materials appear below.

Where Steel Exports Went in Nine Months

Canada Took 371,905 Tons of Nine Leading Items—Japan Retains Second Position with 128,102 Tons, Followed by Argentina with 46,107 Tons and Cuba with 41,756 Tons

Exports from United States, by Countries of Destination

(In Gross Tons)

	Steel Plates				Galvanized Sheets				Black Steel Sheets			
	September		Nine Months Ended September		September		Nine Months Ended September		September		Nine Months Ended September	
	1927	1926	1927	1926	1927	1926	1927	1926	1927	1926	1927	1926
Total	*8,780*	*10,117*	*103,726*	*102,901*	*10,451*	*12,865*	*122,434*	*130,146*	*7,189*	*9,727*	*125,846*	*125,708*
Canada	8,536	8,529	82,420	90,321	1,752	2,555	27,571	35,462	3,346	4,548	51,867	48,046
Japan*	39	48	1,088	480	247	74	3,384	4,463	1,929	3,716	54,132	64,125
Cuba	102	6	567	1,151	724	624	9,532	6,688	50	44	840	443
Philippine Islands	417	....	1,705	....	1,635	1,608	14,005	17,691	149	....	1,988	....
Mexico	24	275	748	1,006	1,156	1,029	6,815	7,387	107	....	1,340	....
Argentina	....	....	....	....	717	856	6,913	7,829	88	33	1,467	747
Chile	....	....	....	....	18	....	1,834	....	831	....	3,110	....
Colombia	....	....	....	....	848	....	7,354	....	45	....	468	....

	Steel Rails				Barbed Wire				Plain and Galvanized Wire			
	September		Nine Months Ended September		September		Nine Months Ended September		September		Nine Months Ended September	
	1927	1926	1927	1926	1927	1926	1927	1926	1927	1926	1927	1926
Total	*11,897*	*19,448*	*135,572*	*130,810*	*4,763*	*3,825*	*38,609*	*43,172*	*4,011*	*1,921*	*25,841*	*25,880*
Canada	1,095	1,882	24,861	20,511	342	367	3,262	4,432	584	679	11,010	9,612
Japan*	2,337	1,956	25,353	22,518	....	....	....	....	26	33	357	914
Cuba	1,249	820	14,751	10,688	495	191	3,131	2,040	131	79	1,047	1,006
Philippine Islands	1,684	211	4,411	4,435	570	217	1,633	4,487	....	....	509	....
Mexico	....	705	4,168	7,629	292	468	3,603	4,802	1,262	379	3,403	4,045
Argentina	....	....	....	....	710	40	4,383	1,798	1,387	37	4,325	2,811
Chile	300	....	3,332	8,602	....	....	....	....	....	....	....	....
Colombia	....	....	....	4,935	....	947	....	4,631	....	....	....	....
Brazil	960	5,805	17,641	9,539	762	430	6,633	6,067	43	57	153	1,121
Australia	....	....	....	....	....	....	....	743	234	485	662	1,805

	Tin Plate				Steel Bars				Plain Heavy Structural Material			
	September		Nine Months Ended September		September		Nine Months Ended September		September		Nine Months Ended September	
	1927	1926	1927	1926	1927	1926	1927	1926	1927	1926	1927	1926
Total	*13,484*	*26,608*	*202,214*	*162,935*	*7,323*	*11,199*	*83,289*	*101,228*	*13,366*	*12,939*	*106,711*	*120,100*
Canada	2,963	8,139	35,225	37,372	3,875	6,094	48,513	61,672	11,451	10,518	87,176	91,790
Japan*	4,593	2,120	40,692	30,237	5	160	670	1,860	4	419	2,426	4,268
Cuba	204	145	3,163	1,615	324	231	2,362	2,881	1,039	385	6,363	6,127
Mexico	668	1,722	9,330	6,960	....	....	....	2,768	....	....	....	....
Argentina	1,634	1,540	28,770	8,429	35	3	249	300	4	....	(a)	....
Chile	394	551	4,490	4,639	....	....	....	....	163	151	2,291	5,537
United Kingdom	....	....	....	....	915	2,175	14,228	19,215	....	....	....	....
China	1,307	2,175	5,838	15,123	....	....	....	....	....	....	....	....
British India	9	888	....	....	....	....	....	....	....	....	....	....
Italy	40	203	12,161	9,929	....	....	....	....	....	....	....	....

*Including Corea.
(a) Not reported.

Surface Tension of Metals

Y. Matuyama, working at the Japanese Iron and Steel Research Institute ("Science Reports," June, 1927), has determined the surface tension of some of the white metals by measuring the size of drops forming at the end of a capillary tube. In all the pure metals the values vary directly with the temperature, between the following limits:

A series of determinations was made also on the cadmium-antimony and the zinc-antimony alloy systems (which have the intermetallic compounds CdSb and Zn_3Sb_2 respectively), and the lead-antimony alloys, which solidify with a simple eutectic. Since the surface tension when plotted against the composition in the first two systems gives a curve which breaks at the location of the compound, whereas the third plotted as a smooth curve, the author concludes that the intermetallic compounds existing in the solid alloy do not decompose on melting and moderate superheating.

Tin (in air)	66.5 mg./mm. at 259 deg. C. and 62.9 mg./mm. at 418 deg. C.
Tin (in vacuum)	58.7 mg./mm. at 250 deg. C. and 51.6 mg./mm. at 600 deg. C.
Bismuth (in vacuum)	39.7 mg./mm. at 293 deg. C. and 35.0 mg./mm. at 600 deg. C.
Cadmium (in vacuum)	65.0 mg./mm. at 355 deg. C. and 60.2 mg./mm. at 589 deg. C.
Lead (in vacuum)	47.5 mg./mm. at 370 deg. C. and 42.4 mg./mm. at 657 deg. C.
Zinc (in vacuum)	78.8 mg./mm. at 470 deg. C. and 74.3 mg./mm. at 635 deg. C.
Antimony (in vacuum)	37.5 mg./mm. at 640 deg. C. and 37.2 mg./mm. at 762 deg. C.

Machinery Exports Fall Sharply

September One-Sixth Below August's Large Total—Imports Continue Heavy, with Nine-Month Total Above 1926

WASHINGTON, Oct. 29.—Reflecting a decrease of $6,729,790, exports of all kinds of machinery in September totaled $34,289,038, against $41,018,828 in August. But for the nine months ended with September they registered a gain of $20,123,470 over the corresponding period of last year, the respective values being $327,282,133 and $307,158,603. In September, 1926, the total was $36,863,991, or $2,574,953 more than in September of the present year.

Exports of industrial machinery in September, 1927, according to the Division of Statistics, Department of Commerce, were valued at $14,300,674, compared with $17,493,192 in August. For the nine months ended with September they aggregated $150,688,192, while in September, 1926, and the nine months of last year the values were $16,270,297 and $134,559,544, respectively.

Exports of all power-driven metal-working machinery in September were valued at $1,554,732, against $1,683,994 in August. For the nine months ended with September the value was $13,747,772. Exports of machine tools listed in THE IRON AGE table numbered 510, with a value of $953,084 in September, compared with 586, valued at $912,321, in August.

Imports of machinery and vehicles in September totaled $2,428,481, against $1,895,336 in August and $2,088,430 in September of last year. For the nine months of the present and last year the respective values were $21,103,263 and $19,975,513. Imports of machinery listed in THE IRON AGE table were valued at $1,165,386 in September, compared with $1,251,074 in August and with $1,432,378 in September of last year. For the nine months of the two years the values were $12,735,148 and $13,572,065, respectively.

The outstanding drop in exports of industrial machinery in September, when compared with the preceding month and with September, 1926, concerned oil well equipment. In August the value was $1,599,000 and in September of last year it was $1,963,710, while in September of the present year the total was only $640,681. Shipments of this class of machinery for the nine months ended with September, however, were well above those for the corresponding period of last year, the respective values being $14,162,916 and $11,068,345. The drop in September is charged to overproduction of oil throughout the world. Well drilling exports in September fell to $444,100, from $885,312 in September of last year. The greatest decrease was in "other oil-well equipment," which decreased abruptly to $196. Shipments of mining and quarrying machinery and of internal combustion engines also decreased rather sharply, as did construction and conveying machinery.

In contrast to the trend in the foregoing lines, exports of metal-working and textile machinery moved upward. In the miscellaneous industrial machinery group, shipments of sugar-mill machinery were valued at $975,791 in September, against $515,220 for September of last year. Exports of air compressors have also moved upward, both for the month and for the longer period. Shipments of agricultural machinery and implements in September were valued at $8,689,798 against $8,338,082 in September of last year. For the nine months of the two years the values were about equal.

Exports of Power-Driven Metal-Working Machinery

	September, 1927		August, 1927	
	No.	Value	No.	Value
Engine lathes	38	$103,228	32	$100,395
Turret lathes	15	33,855	19	52,819
Other lathes	25	156,174	49	112,404
Vertical boring mills and chucking machines	11	19,792	6	12,777
Thread-cutting and automatic screw machines	47	47,298	78	76,302
Knee and column-type milling machines	5	11,842	9	15,301
Other milling machines	37	101,300	23	48,924
Gear-cutting machines	29	100,830	29	95,168
Vertical drilling machines	15	20,471	28	24,916
Radial drilling machines	8	15,462	7	25,151
Sensitive drilling machines	75	2,166	32	7,165
Other drilling machines	27	10,082	79	34,154
Shapers and slotters	23	43,238	40	58,741
Planers	6	20,041	2	1,840
External cylindrical grinding machines	66	132,609	48	128,283
Internal grinding machines	46	110,101	36	86,271
Metal-working tool-sharpening machines	37	24,595	69	31,710
Total	510	$953,084	586	$912,321

Imports of Machinery into the United States

(By Value)

	September		Nine Months Ended September	
	1927	1926	1927	1926
Metal-working machine tools and parts	$46,861	$35,043	$328,140	$331,842
Agricultural machinery and implements	239,668	233,029	3,802,983	4,082,358
Electrical machinery and apparatus	121,699	53,766	1,341,345	652,391
Other power-generating machinery	655	482	8,726	5,576
Other machinery	588,315	883,184	6,251,372	6,889,983
Vehicles, except agricultural	168,188	226,874	1,002,582	1,609,915
Total	$1,165,386	$1,432,378	$12,735,148	$13,572,065

Machinery Exports from the United States

(By Value, in Thousands of Dollars)

	September		Nine Months Ended September	
	1927	1926	1927	1926
Locomotives	$99	$189	$4,404	$4,523
Other steam engines	76	145	1,092	812
Boilers	58	134	667	1,267
Accessories and parts	101	247	427	1,313
Automobile engines	714	872	9,528	10,739
Other internal combustion engines	575	918	5,524	7,212
Accessories and parts	186	742	2,640	7,305
Electric locomotives	227	448	821	2,063
Other electric machinery and apparatus	447	687	5,680	5,485
Excavating machinery	459	542	3,606	3,639
Concrete mixers	92	47	882	567
Road-making machinery	147	119	1,703	1,394
Elevators and elevator machinery	334	531	3,661	3,898
Mining and quarrying machinery	906	1,235	10,082	11,669
Oil-well machinery	641	1,964	14,163	11,068
Pumps	559	573	4,802	4,606
Bending and power presses	75	224	391	1,028
Forging machines	96	57	772	870
Machine tools (a)	997	494	8,391	5,737
Other metal-working machinery and parts	214	439	2,305	3,392
Textile machinery	818	782	6,314	7,988
Sewing machines	335	785	4,322	6,438
Shoe machinery	116	91	1,244	1,013
Flour-mill and gristmill machinery	27	91	400	674
Sugar-mill machinery	958	515	3,228	2,673
Paper and pulp-mill machinery	182	130	2,866	2,194
Sawmill machinery	54	102	596	776
Other woodworking machinery	102	116	1,055	924
Refrigerating and ice-making machinery	152	425	7,807	3,567
Air compressors	362	284	4,484	3,570
Typewriters	1,464	1,428	15,412	13,828
Power laundry machinery	30	102	1,171	1,062
Typesetting machines	352	436	3,247	2,919
Printing presses	401	569	4,673	4,936
Agricultural machinery and implements	8,690	8,338	72,456	72,513
All other machinery and parts	13,245	12,061	116,466	93,497
Total	$34,289	$36,864	$327,282	$307,159

(a) Shown in detail in another table.

Machinery Markets and News of the Works

NORFOLK & WESTERN LIST

Virginia Road Inquires for Upward of 100 Items of Shop Equipment

October Machine Tool Buying Shows Gain Over September of 10 to 25 Per Cent

THE increase in the volume of machine tool buying in October over that of September is variously estimated at 10 to 25 per cent, the latter figure reflecting the view of many of the manufacturers in the Cincinnati district. The gain was largely attributed to purchases by automotive industries, but the same scale of purchasing is not looked for this month, seeing that inquiries from automobile companies have largely been acted upon. A considerable volume of business is pending in the general industrial field, but an upturn in the business situation is awaited by many prospective buyers before the placing of orders. In the railroad field the outstanding news of interest to the machinery trade is a list of 104 machine tools and other items of shop equipment upon which the Norfolk & Western will take bids this week.

Despite the improvement in machine tool business in October the total for the month was below that of last year at this time. It is not expected that November will show a further increase, and the machine tool trade is looking to the early months of 1928 for an upward swing in business rather than to the remaining months of this year. In line with this analysis of the situation machine tool builders are mostly operating their plants on a curtailed production basis.

Among the larger purchasers of equipment in the week are the Chevrolet Motor Co., Willys Overland Co. and the Electric Auto-Lite Co., all of Toledo, Ohio, and the Clark Equipment Co., Buchanan, Mich. The International Harvester Co. will purchase equipment for its "Farm-All" plant at Rock Island, Ill. The United States Navy is inquiring for 11 engine lathes for delivery at Mare Island, Cal.

A large electric machinery company has issued an inquiry for 13 electric traveling cranes of various capacities.

New York

NEW YORK, Nov. 1.

SALES of machine tools in this district in October ran slightly ahead of those of the preceding month. Some estimates are that the gain was 15 or 20 per cent on the average. Inquiries are not numerous, however. Among the week's sales were the following: Blount speed lathe, 11 in. x 3 ft., to Pratt & Whitney Aircraft Corporation, Hartford, Conn.; a used Racine hack saw to a company at Bellefonte, Pa.; a 24-in. Niles-Acme shaper to a chemical company in New Jersey; a 6000-lb. steam hammer to the Central Railroad of Georgia; a special grinding machine to a New York State manufacturer of magnetos, and a profiling machine to a typewriter company at Hartford, Conn.

The Gates & Day Aircraft Corporation, care of Max J. Finkelstein, 21 East Fortieth Street, New York, attorney, organized under New Jersey laws with a capital of $250,000, has leased factory property near Teterboro, N. J., for a new plant for the production of airplanes and parts. The works will be of temporary character, pending the early erection of a new plant on neighboring site, consisting of two or more one-story units to cost close to $100,000 with equipment. The new plant will specialize in the manufacture of radial air-cooled motors for all types of aircraft, popular priced airplanes for commercial and other service, and special monoplanes. Ivan R. Gates and Charles Healy Day head the new company.

The Kings County Refrigerating Co., Hall Street, Park and Washington Avenues, Brooklyn, has arranged for a bond issue of $400,000, a portion of the proceeds to be used for expansion and equipment, including additions and improvements now under way. The company is affiliated with the Union Terminal Storage Co., Twelfth Street, Jersey City, N. J.

M. W. Whinston, 116 West Thirty-ninth Street, New York, architect, is completing plans for a new five-story automobile service, repair and garage building, 50 x 100 ft., to cost close to $200,000 with equipment.

In connection with an expansion program, the Motometer Co., 21 Wilbur Avenue, Long Island City, manufacturer of automobile specialties, etc., has work nearing completion on an addition to the plant of its subsidiary, the National Gauge & Equipment Co., La Crosse, Wis., to increase the floor space about 40 per cent.

The Tremley Oil Co., 26 Beaver Street, New York, has awarded contract to the Anchor Corrugating Co., 145 West Forty-fifth Street, for a new one-story storage and distributing plant, 85 x 100 ft., at Long Island City.

Fire, Oct. 13, damaged a portion of the plant of the Eastern Steel Bed Corporation, 516-26 Dumont Avenue, Brooklyn. An official estimate of loss has not been announced.

John N. Linn, 371 Fulton Street, Brooklyn, architect, will prepare plans for a new automobile service, repair and garage building, 100 x 175 ft., on the site of the former plant of the Empire China Works, 144-56 Greene Street, which will be razed. The new structure is reported to cost upward of $135,000 with equipment.

The Board of Education, 500 Park Avenue, New York, is said to be planning the installation of manual training equipment in a new six-story high school at 62-80 Ludlow Street, to cost $2,000,000, for which superstructure will soon begin. William H. Gompert, Flatbush Avenue Extension and Concord Street, Brooklyn, is architect.

The Pelham Bay Garage Co., Inc., care of William Shary, 41 Union Square, New York, architect, has filed plans for a two-story service, repair and garage building, 103 x 168 ft., to cost approximately $100,000 with equipment.

The M. H. Treadwell Co., 140 Cedar Street, New York, manufacturer of crystallizers and other mechanical equipment, has awarded a general contract to the Connolly Contracting Co., Secaucus Road, Jersey City, N. J., for a new one-story plant at Jersey City, to cost more than $60,000 with equipment.

A merger has been arranged between the Radio Foundation, Inc., 116-18 West Fourteenth Street, New York, manufacturer of speakers and other radio equipment, and the Spartan Electric Corporation, 350 West Thirty-fourth Street, manufacturer of kindred apparatus, under the first noted name. Production will be increased and all manufacturing concentrated at the plant of the last noted company at 164 Pennington Street, Newark, N. J.

The Board of Education, South Broad Street, Elizabeth, N. J., plans the installation of manual training equipment in a proposed three-story high school on Scott Place to cost $750,000, for which bids will be asked on a general contract about the middle of November. H. B. Brady, Inc., 333 North Broad Street, is architect.

The Automatic Recording Safe Co., 159 North State Street, Chicago, manufacturer of banks and devices for home savings, bankers' specialties, etc., has leased two floors in the factory at High Street and Boyden Place, Newark, N. J., for a new branch plant.

The Hygienic Tube Co., 88 McWhorter Street, Newark, manufacturer of collapsible tubing, etc., is revising plans for a one-story addition, 100 x 100 ft., to cost about $45,000 with equipment. Alfred Peter, 207 Market Street, is architect.

The Krautter-Weber Tool Co., 86 Monroe Street, Newark, has leased a portion of the building at Ferry and St. Francis Streets for the establishment of a new plant for increased output. The Terminal Pattern & Model Works, Inc., manufacturer of metal patterns, etc., also located at 86 Monroe Street, has taken over another section of the factory at Ferry and St. Francis Street, and will likewise expand production.

The Miele Mfg. Co., Inc., 647-653 South Fifteenth Street, Newark, N. J., manufacturer of welded steel products, is building an extension to its present plant.

The Miller Screen Co., Inc., 793 East Twenty-fifth Street, Paterson, N. J., has been organized to manufacture screens, storm sash and kindred materials.

New England

BOSTON, Oct. 31.

THE Central Maine Power Co., Augusta, Me., has plans for a new hydroelectric generating plant at the Libbey and Dingley dam, near Lewiston, Me., to cost in excess of $175,000 with transmission line. It is scheduled for completion in June.

The American Fastener Co., Maple Avenue, Waterbury, Conn., manufacturer of metal snap fasteners, etc., has asked bids on a general contract for a four-story and basement addition, 40 x 105 ft., to cost upward of $75,000 with equipment. C. Jerome Bailey, Waterbury, is architect.

The American Reinforced Paper Co., County Street, Attleboro, Mass., has awarded a general contract to C. K. Rathbone, 112 Medway Street, Providence, R. I., for a one-story addition, 60 x 172 ft., to cost about $65,000 with equipment.

Winslow & Co., Inc., Forest Avenue, Portland, Me., manufacturer of firebrick, etc., is considering rebuilding the portion of its plant destroyed by fire Oct. 25, with loss estimated at more than $200,000 including equipment.

The Norfolk Woodworking Co., 275 Hancock Street, Quincy, Mass., is completing plans for an addition, 70 x 300 ft., with extension, 60 x 130 ft., to cost more than $60,000 with equipment. L. S. Joslin, 339 Newbury Street, Boston, is architect.

The Boston & Albany Railroad Co., South Station, Boston, is completing plans for a one-story power house, 50 x 115 ft., at West Springfield, Mass., to cost in excess of $400,000 with equipment. Densmore, LeClear & Robbins, 31 St. James Avenue, Boston, are architects.

The Boston Consolidated Gas Co., 149 Tremont Street, Boston, is arranging for a new capital stock issue to total $6,500,000, a portion of the fund to be used for extensions and improvements.

The American Brass Co., Waterbury, Conn., has awarded a general contract to the Tracy Brothers Co., Waterbury, for a one-story addition, 42 x 66 ft.

The Western Maine Power Co., Limerick, Me., has concluded negotiations for the purchase of two sites in the Little Ossipee River Valley, and proposes a hydroelectric power development in that district in the near future. The company is a subsidiary of the New England Public Service Co.

The Raybestos Co., East Main Street, Stratford, Conn., manufacturer of automobile brake lining, etc., has taken out a permit for a one-story addition, 40 x 46 ft., for which contract recently was let to the T. J. Pardy Construction Co., Seaview Avenue. Headquarters are at Bridgeport.

T. J. H. Pierce, 50 Allen Avenue, Providence, R. I., architect, is completing plans for a three-story automobile service, repair and garage building, to cost approximately $150,000 with equipment.

The Arrow Screen Co., Wethersfield, Conn., manufacturer of screens and wire specialties, has begun the erection of a new one-story works, 25 x 130 ft.

The Beardsley Mfg. Co., Waterbury, Conn., has been organized with a paid in capital stock of $500,000 to take over the business of the Novelty Mfg. Co., Waterbury, more recently operated as a branch of the Risdon Mfg. Co. Operations will be continued as heretofore with some additions to the line of electrical household appliances and similar products.

The Harnischfeger Corporation, Milwaukee, has opened a new branch office at 194 Boylston Street, Boston, in charge of D. J. Calder.

Philadelphia

PHILADELPHIA, Oct. 31.

THE Reading Co., Reading Terminal, Philadelphia, has detailed plans in preparation for the electrification of its Chestnut Hill branch, with work to begin during the coming year, estimated to cost more than $4,000,000 with equipment, including the electrifying of the terminal. Plans will also be arranged for the similar improvement of the Glenside and Langhorne branches, to cost approximately $5,000,000.

The Yarnall-Waring Co., 102 East Mermaid Lane, Philadelphia, manufacturer of power plant equipment, has awarded a general contract to T. W. Kittelman, 125 East Upsal Street, for extensions and improvements to cost about $18,000.

Bids will be asked at once by the J. Warren Watson Co., Twenty-fourth and Locust Streets, Philadelphia, manufacturer of automobile shock absorbers, for a one-story plant addition to cost more than $65,000. The Ballinger Co., 105 South Twelfth Street, is architect and engineer.

The John Lang Paper Co., Twenty-fourth and Wood Streets, Philadelphia, has awarded a general contract to Barclay White & Co., 1713 Sansom Street, for extensions and improvements in the former shipyard of Pusey & Jones, Inc., Gloucester, N. J., to be occupied as a new mill. A one-story addition will be erected. The entire project is reported to cost in excess of $185,000.

The General Furniture Co., Bloomsburg, Pa., headed by W. R. Monroe, Bloomsburg, and associates, has acquired the local plant of the Monroe Corporation, manufacturer of furniture specialties, recently in receivership, and will operate in the near future. Equipment improvements are planned.

The Elliott-Fisher Co., Harrisburg, Pa., manufacturer of calculating machines, typewriters, etc., has preliminary plans for extensions and improvements, to include the installation of additional equipment, to cost close to $100,000. The company is completing arrangements for a merger with the Underwood Typewriter Co., 30 Vesey Street, New York.

The Board of Education, Sayre, Pa., plans the installation of manual training equipment in a new two-story high school to cost $325,000, for which foundations will soon be laid. Randall & Veeder, 703-5 Sedgwick Street, Syracuse, N. Y., are architects.

Plans have been arranged for a consolidation of the Hazard Wire Rope Co., Wilkes-Barre, Pa., and the Waterbury Co., 132 Taaffe Place, Brooklyn, N. Y., manufacturer of wire rope, cordage, etc. The production of wire rope, cable, etc., will be concentrated at the Wilkes-Barre plant, and machinery used for this purpose at the Brooklyn factory will be removed to that location. The Brooklyn mill will be continued for the production of cordage.

C. K. Williams & Co., Inc., Easton, Pa., manufacturer of paint pigments, etc., has plans maturing for a new one and two-story plant in the Shell Mound Park district, Emeryville, Cal., where a 10-acre tract has been secured. It is estimated to cost $75,000 with equipment. Reed & Corlett, Oakland Bank of Savings Building, Oakland, Cal., are architects.

The Lehigh Foundries, Inc., Easton, Pa., care of Alexander A. Shumann, Morrisville, Pa., treasurer, recently formed by Mr. Shumann and associates, has concluded arrangements for the purchase of the Easton plant of the Kuebler Foundries, Inc., bankrupt, recently secured at a receiver's sale by the Gibney Iron & Steel Co., Phillipsburg, N. J., and which is now disposing of the property. The new owner will make improvements in the foundry and install equipment for the production of iron castings. The Lehigh company is capitalized at $100,000. Other officials include Frank E. Shumann, Slingerlands, N. Y., and George M. Douthett, 811 Coleman Street, Easton.

The Linde Air Products Co., 30 East Forty-second Street, New York, manufacturer of industrial oxygen specialties, welding apparatus, etc., is said to be planning the erection of a new plant at Allentown, Pa., to cost more than $100,000 with equipment. The company is a subsidiary of the Union Carbide & Carbon Co., address noted. The engineering department of the last noted company will be in charge.

The Pennsylvania Power & Light Co., Allentown, Pa., is arranging for a new bond issue of $24,000,000, a portion of the fund to be used for extensions and improvements in power plants and transmission lines, the latter to include a portion of the proposed steel tower superpower transmission system to connect with the lines of the Philadelphia Electric Co. and the Public Service Electric & Gas Co., the latter in New Jersey. The company is under the direction of the Electric Bond & Share Co., 2 Rector Street, New York.

The National Acme Co., East 131st Street and Colt Road, Cleveland, manufacturer of automatic screw machinery, etc., has arranged to concentrate production of centrifugals,

The Crane Market

THE locomotive crane field continues quiet, but inquiries for overhead cranes are more numerous, giving promise of a fair volume of purchasing in the near future. One outstanding list of overhead equipment is the 13 electric cranes for the West Philadelphia plant of the General Electric Co., Schenectady, N. Y. Included in the list are four traveling electric wall cranes and several small capacity overhead cranes. The report that there is an export inquiry current for 12 60-ton hand-power cranes is unconfirmed. There were several sales of locomotive cranes in the New York district in the past week.

Among recent purchasers are:

Stevens & Wood, Inc., 120 Broadway, New York, a 20-ton electrically-driven locomotive crane for use at Toronto, Ohio, from the Industrial-Brownhoist Corporation.

Ohio Quarries Co., Amherst, Ohio, a 25-ton locomotive crane from an unnamed builder.

Central Vermont Railway, St. Albans, Vt., a 15-ton, 46-ft. span overhead traveling crane from the Niles Crane Corporation.

General Electric Co., Schenectady, N. Y., a 100-ton, 56-ft. span overhead crane for West Philadelphia from an Eastern builder.

Pullman Car & Mfg. Corporation, Chicago, eight 1-ton jib cranes from an unnamed builder.

pumps, separators and kindred equipment, heretofore manufactured at the plant of the Positive Filling Machine Co., 1815 Sedgley Street, Philadelphia, at its Cleveland works, to be known as the Positive Machinery Division of the company. The Positive company was recently acquired. It is understood that the Philadelphia works will be discontinued.

The plant and property of the Wales Adding Machine Co., Wilkes-Barre, Pa., has been acquired at a public sale by the Remington-Rand Co., Inc., 420 Lexington Avenue, New York, manufacturer of typewriters and other office equipment, for a price of $310,000. The factory will be improved and reopened under the direction of the Powers Accounting Machine Co., 115 Broadway, New York, a subsidiary of the purchasing company.

South Atlantic States

BALTIMORE, Oct. 31.

THE School Board of the city of Baltimore, Madison and Lafayette Avenues, has asked bids on a general contract for a three-story mechanical repair and equipment shop, with storage and distributing facilities reported to cost in excess of $50,000. William F. Stone, Munsey Building, is architect; Henry Adams, Calvert Building, is mechanical engineer.

Stanislaus Russell, 11 East Lexington Street, Baltimore, architect, has plans under way for a one-story automobile service, repair and garage building, to cost $100,000 with equipment.

The Locust Pin Co., Inc., Front Royal, Va., manufacturer of insulator pins, brackets, etc., is said to be planning to rebuild the portion of its plant destroyed by fire Oct. 27, with loss estimated at $27,000 including equipment. B. J. Hillidge is manager.

The Board of District Commissioners, District Building, Washington, is asking bids until Nov. 7 for one horizontal centrifugal motor-driven air compressor, for installation in the power plant in the District Building.

Romberg & Caldwell, Gainesville, Ga., have concluded arrangements for the purchase of a substantial interest in the plant of the Claxton Ice Co., Claxton, Ga., and will be active in the management. Plans are under way for the construction of a new unit with capacity of 20 tons per day. A cold storage and refrigerating plant is also under consideration.

The Chevrolet Motor Co., Detroit, with main factory at Flint, Mich., a division of the General Motors Corporation, Detroit, has engaged Albert Kahn, Inc., Marquette Building, Detroit, architect and engineer, to prepare plans for its proposed new assembling and body-manufacturing plant at Atlanta, Ga., consisting of four one-story units to cost close to $2,500,000 with machinery. It is expected to ask bids in November.

L. J. Fisher, Franklin, Va., has inquiries out for a double cylinder, double or single drum hoisting engine, 8 x 10 in., with or without boiler.

The Southern Railway System, 1300 Pennsylvania Avenue, Washington, has awarded a general contract to the Consolidated Engineering Co., 20 East Franklin Street, Baltimore, for a new engine house and machine repair shop at Winston-Salem, N. C., to cost in excess of $50,000 with equipment. The company is said to be planning the early erection of a similar and larger terminal at Macon, Ga., consisting of 24-stall engine house, with repair shops, boiler shop, power plant, coaling system, water tank and tower and administration building, to cost more than $100,000.

The Bureau of Supplies and Accounts, Navy Department, Washington, will receive bids until Nov. 8 for two Diesel engine-driven electric generator outfits for the Norfolk Navy Yard, schedule 7966.

The Maryland Paper Mills, Inc., Baltimore, care of Robert A. Wilson, 5 Hopkins Place, city, recently organized with a capital of $1,000,000, has acquired a tract of more than 35 acres at Glenburnie, near Baltimore, as a site for a new mill for the manufacture of paper and paper containers. The initial unit will be equipped for the latter product and will be one story, 50 x 200 ft., to cost more than $100,000 with machinery. It is expected to begin work before the close of the year. The company is arranging for a sale of stock to approximate $1,000,000, a considerable portion of the fund to be used for the mills. William W. Ormsbee will be president and general manager. Robert D. Burbank, 1103 Vermont Avenue, N. W., Washington, is also interested in the company.

The War Department, Washington, has authorized each of the nine corps area commanders to form a corps area motor repair and service shop, to handle all repairs, including unit assemblies and sub-assemblies to motor trucks and other Government automobiles requiring not more than 100 man-hours to complete. The different repair centers will include Camp Holabird, Md.; Jeffersonville, Ind.; Normoyle, Tex., and San Francisco.

The Duke Power Co., Charlotte, N. C., is completing an expansion program to cost close to $40,000,000, including projects of all character, with power enterprises to cost approximately $12,000,000. The latter will include three steam-operated electric generating plants on locations soon to be selected, to cost about $2,000,000 with machinery; this project will be carried out in connection with the proposed extension of the Piedmont & Northern Railway, an affiliated interest, which will cost about $15,000,000; new hydroelectric generating plant on site to be secured, estimated to cost $6,000,000 with transmission line; and new hydroelectric power station at Oxford Shoals, Catawba County, to cost approximately $2,000,000 with transmission system. The latter project is scheduled for completion next year. Extension projects of the Southern Power Co. and Southern Public Utilities Co., affiliated interests, will cost more than $1,000,000, including transmission lines. Work is under way on a hydroelectric power development at High Rock, near Salisbury, for the Tallahassee Power Co., a subsidiary, to cost more than $1,750,000.

The Walcott-Taylor Co., 501 Mills Building, Washington, has been formed to act as agent in that territory for the General Fireproofing Co., Youngstown, and of several other manufacturers of office and factory equipment and supplies.

Pittsburgh

PITTSBURGH, Oct. 31.

THE American Spiral Spring & Mfg. Co., 5540 Harrison Street, Pittsburgh, has acquired property adjoining its plant, 100 x 100 ft., and is said to be contemplating the erection of a one-story addition.

The Harbison-Walker Refractories Co., Farmers' Bank Building, Pittsburgh, is reported planning extensions and improvements in its fire brick and refractory plant at Downingtown, Pa., including remodeling of present structures and installation of additional equipment. W. C. Iffarth is company engineer.

The State Board of Control, Charleston, W. Va., has approved plans for a new unit for mechanical shops and trade school at Pruntytown, near Grafton, W. Va., for the State Boys' Industrial School division, to cost about $100,000 with equipment. R. A. Gillis, Fairmont, W. Va., is architect.

The Standard Auto Co., Greensburg, Pa., has asked bids on a general contract for a new service, repair and garage building, to cost upward of $75,000 with equipment. Bartholomew & Smith, Keenan Building, Pittsburgh, are architects.

The Standard Plate Glass Co., First National Bank

Building, Pittsburgh, has filed plans for a new unit, to cost in excess of $100,000 with equipment.

The Common Council, Romney, W. Va., plans the installation of pumping equipment and other power machinery in connection with extensions and improvements in the municipal waterworks, using the South Branch River as a source of supply. A bond issue of $50,000 is being arranged.

The New Kanawha Power Co., Glen Ferris, W. Va., is reported to be planning a hydroelectric power development on the New River, Kanawha Valley district, W. Va., to consist of three or more power dams, generating stations and transmission lines. Executive offices are at 30 East Forty-second Street, New York.

The Columbia Radiator Co., McKeesport, Pa., has acquired all assets and equipment of the Ironton-Bernhard Boiler Co., Ironton, Ohio, and will manufacture and distribute the entire line of Bernhard triple combustion boilers. J. B. Bernhard will be associated with the Columbia company in a sales capacity.

Buffalo

BUFFALO, Oct. 31.

THE Union School District, Trumansburg, N. Y., contemplates the installation of manual training equipment in a proposed three-story high and grade school to cost $200,000, to replace a structure recently destroyed by fire. Bids will be asked on a general contract in about 60 days. Carl Ade, 104 East Avenue, Rochester, N. Y., is architect.

The McCauley Metal Products Co., 660 Grant Street, Buffalo, has plans for a one-story addition for which superstructure will soon begin.

The Board of Education, Kenmore, N. Y., contemplates the installation of manual training equipment in a proposed addition to the high school to cost $725,000, for which plans will soon be drawn.

The New Gas Furnace Co., Inc., Buffalo, care of Merton S. Gibbs, Iroquois Building, attorney, recently formed with a capital of $200,000, plans the early operation of a local factory for the manufacture of heating equipment, furnaces and boilers. Frank C. Battaglia, 354 Starin Avenue, is one of the heads of the company.

The Packard Motor Car Co., 1325 Main Street, Buffalo, has filed plans for a one-story addition to its service and repair building to cost $75,000. Additional mechanical equipment will be installed.

The address of the E. D. Clapp Mfg. Co., Auburn, N. Y., has been changed from 86 South Division Street to 86 Columbus Street.

Detroit

DETROIT, Oct. 31.

BIDS will soon be asked by the Kewaunee Mfg. Co., Kewaunee, Wis., manufacturer of laboratory furniture and equipment, for a one-story top addition to its plant at Adrian, Mich., to cost close to $40,000 with equipment.

George E. Kramer, president and general manager Marine Motor Castings Co., Marine City, Mich., is planning the establishment of a new local plant for another interest, known as the K-B Mfg. Co., specializing in the manufacture of safety devices for punch presses and other equipment. The company has heretofore been located at Fowlerville, Mich. W. K. Brower is an official of the K-B company.

The National Standard Co., Niles, Mich., manufacturer of track tools, wheel jacks, braided wire, steel cables, etc., is concluding arrangements for the purchase of the carrier division of the Electric Refrigeration Corporation, Detroit, devoted to the production of carriers for spare tires, tire locks, radiator fans and other kindred automotive equipment; and acquisition of the Oakes Co., 3019 Roosevelt Avenue, Indianapolis, manufacturer of kindred equipment. The two interests will be continued as subsidiaries and expansion plans carried out. The Oakes Co. has heretofore been under the control of the Martin-Parry Co., Indianapolis, manufacturer of automobile bodies. The purchasing company is arranging for an increase in capital from 150,000 to 210,000 shares of stock, no par value, the fund to be used in connection with the acquisitions and for extensions.

The Department of Public Works, City Hall, Detroit, is having plans prepared for a new two-story municipal service, repair and garage building for city automobiles and trucks, 50 x 200 ft., to cost in excess of $100,000 with equipment. P. A. Fellows, City Hall, is engineer.

The Acme Wire & Iron Works, Detroit, has arranged for the removal of its plant from Canfield Avenue to 12340 Cloverdale Avenue, where increased production facilities will be provided.

The Reo Motor Car Co., Lansing, Mich., has arranged for a stock issue of $3,645,000, a portion of the proceeds to be used for expansion.

Smith, Hinchman & Grylls, Marquette Building, Detroit, architects, have preliminary plans for a new eight-story automobile service, repair and garage building, to cost in excess of $500,000 with equipment.

The Berridge Shear Co., Sturgis, Mich., manufacturer of shears, crimpers, etc., contemplates rebuilding the portion of its plant destroyed by fire Oct. 18, with loss reported in excess of $40,000 including equipment.

Bids have been asked on a general contract by the Kermath Mfg. Co., 5890 Commonwealth Avenue, Detroit, manufacturer of marine engines and parts, for a three-story addition, 30 x 69 ft., to cost about $65,000 with equipment. J. H. G. Steffens, 415 Brainerd Street, is architect.

The Board of Works, Ann Arbor, Mich., is said to be planning the installation of pumping machinery and other power equipment in connection with proposed extensions and improvements in the municipal waterworks to cost $500,000. A bond issue is being arranged.

The Detroit Street Railway Commission, Detroit, has approved plans for a new one-story car house, with repair facilities, to cost $70,500.

The Norton Co., Worcester, Mass., has opened a new storehouse at 5805 Lincoln Avenue to house the district offices and storerooms formerly located at 233 West Congress Street, Detroit. More than half of the 50,000 sq. ft. of floor space in the new building has been designed to store grinding wheels and other abrasive products. Adjoining the building is a freight dock connected to the main building by a bridge in which is a conveyor for incoming freight.

The Dowagiac Steel Furnace Co., Dowagiac, Mich., has been formed to manufacture steel furnaces, particularly for the oil burner industry. The buildings formerly occupied by the Dowagiac Drill Works in that city have been acquired by the new organization and the greater part of the machinery and equipment needed for manufacture has been purchased. The plant will be in operation in November. Ralph S. McNaney is president of the company; DeForest Carney, vice-president; A. R. Geer, treasurer, and Arthur Wick, secretary.

Cleveland

CLEVELAND, Oct. 31.

THE slight increase in machine tool sales noted last week is being maintained and the October volume showed an increase over September, which was a very dull month. Business is well scattered and most orders are for single machines. There is some activity in Toledo, where orders for several machines were placed by the Electric Auto-Lite Co., Willys Overland Co. and the Chevrolet Motor Co. These orders include seven multiple spindle drilling machines and four special drilling machines. There is a moderate volume of new inquiry for single machines.

The Sunlight Electric Mfg. Co., Warren, Ohio, manufacturer of fractional horse power motors, has been purchased by Glen P. Cowan, Detroit, who has acquired all the capital stock. Reorganization of the company has been effected, but it is stated that the old management will remain. J. B. Estabrook, who was general manager and treasurer, has been made president and general manager. F. S. Kingston, formerly production manager, is vice-president in charge of production. Mr. Cowan and associates last January acquired control of the Byers Machine Co., Ravenna, Ohio.

Contract has been let by the Champion Machine & Forging Co., 3695 East Seventy-eighth Street, Cleveland, to the Hecker-Moon Co., 8701 Union Avenue, for a one-story addition for the drop forge department, to cost approximately $45,000 with equipment.

The Water Department, Canton, Ohio, is considering the installation of a pumping plant and water-softening plant at its new waterworks station, near the Brookside Country Club, to cost in excess of $85,000.

The Erie Railroad Co., with executive offices at 50 Church Street, New York, has plans under way for a new coaling station at Kent, Ohio, to cost more than $50,000 with machinery.

The Galion Iron Works, Galion, Ohio, manufacturer of road-building machinery, etc., has awarded a general contract to W. J. Shirmer, 1720 Euclid Avenue, Cleveland, for a one-story addition to cost about $40,000. Althouse & Jones, Market Building, Mansfield, Ohio, are architects.

The Bryant Heater & Mfg. Co., 17825 St. Clair Avenue, N. E., Cleveland, is arranging for two one-story top addi-

tions to the present plant to cost close to $50,000 with equipment. Fox, Duthie & Foose, 6523 Euclid Avenue, are architects.

Chicago

CHICAGO, Oct. 31.

THE machine tool market is holding the gain in sales made earlier in the month. Purchases for the most part are for single tools and come from widely divergent sources. October has proved to be a good month, largely because of several sizable industrial lists. Large inquiry is now lacking and dealers do not believe that scattered sales in November can approach in volume the sales made in the month now ending. Changes in prices, some up and others down, are noted in several lines of shapers and lathes.

The Monon Railroad may come into the market for a few tools for the Lafayette, Ind., shops and the International Harvester Co. will purchase equipment for its Farm-All plant at Rock Island, Ill. The Union Pacific has asked for figures for use in preparing a budget. The Clark Equipment Co., Buchanan, Mich., has closed for $75,000 worth of equipment; a Chicago valve manufacturer has purchased two 16-in. lathes and an elevator maker has bought a 20-in. shaper.

The Rock Island Stove Co., Rock Island, Ill., will build an addition to cost $25,000.

The Federal Machinery Sales Co., 17 South Jefferson Street, Chicago, has been appointed Chicago sales representative of the Reed-Prentice Corporation, Worcester, Mass., and will handle the sale of the Becker vertical milling machine in that territory.

The Mapes & Sprowl Steel Corporation, 817 West Twenty-second Street, Chicago, has been organized by the Mapes & Sprowl Steel Co., Newark, N. J., to operate a warehouse in Chicago for the sale of steel sheets, strips, bars and steel specialties. C. I. Sprowl is president; C. D. Mapes, vice-president; J. S. Hecox, secretary-treasurer, and J. W. Northrop, assistant secretary-treasurer and general manager.

The Davenport Locomotive & Mfg. Corporation, Davenport, Iowa, has been organized to take over the entire assets and business of the Davenport Locomotive Works, and will continue operations as in the past, manufacturing gas-electric locomotives, steam locomotives, boilers and tanks, gray iron castings, forgings and heavy machine work.

Plans have been filed by the Interstate Iron & Steel Co., Chicago, for a one-story addition, 110 x 478 ft., to its plant at Burley Avenue and 118th Street, to cost about $220,000 with equipment. General contract has been let to Fitzsimmons & Connell, 10 South La Salle Street.

The S. & S. Machine Works, 1539 West Lake Street, Chicago, has awarded a general contract to F. Voras & Co., 4101 North Western Avenue, for a one-story machine shop to cost $25,000. M. A. Nelson, 1722 North California Avenue, is architect.

The Northern Pacific Railroad Co., Fifth and Jackson Streets, St. Paul, Minn., is said to be planning the installation of a group of about 23 water softening plants along its line in western North Dakota and eastern Montana, to cost close to $300,000.

The Springfield Milling Co., Springfield, Minn., is said to be arranging the early rebuilding of the portion of its elevator destroyed by fire Oct. 24, with loss estimated at $75,000 including equipment.

The A. Finkl & Sons Co., 1326 Cortland Street, Chicago, manufacturer of forge equipment, etc., has asked bids on a general contract for a one-story addition, to be equipped primarily as a machine shop, to cost close to $40,000 with machinery. F. D. Chase, Inc., 720 North Michigan Boulevard, is architect and engineer.

The Chicago Panel Stone Co., 429 West Superior Street, Chicago, manufacturer of cast artificial stone products, a subsidiary of the National Panel Stone Co., has leased a new one-story building, 200 x 300 ft., for a new plant. The present works will be continued for laboratory service and expansion carried out in this department.

The Texas Co., Craig, Colo., is reported to be planning to rebuild the portion of its local oil refinery destroyed by fire Oct. 21, with loss estimated at close to $35,000 with equipment. Headquarters are at 17 Battery Place, New York.

The Ruberoid Co., Joliet, Ill., manufacturer of roofing products, has awarded a general contract to the Kaiser-Ducett Co., Rialto Square Building, for a one-story building to cost about $100,000. Executive offices are at 95 Madison Avenue, New York.

The Continental Oil Co., Continental Building, Denver, Colo., operating oil refineries at Cowley and Glenrock, Wyo., Chanute, Kan., and other localities, has arranged for a bond issue of $12,000,000, a portion of the proceeds to be used for expansion and betterments.

The Montana Cities Gas Co., Great Falls, Mont., has contracted with the Hope Engineering & Supply Co., Mount Vernon, Ohio, for the construction of a pipeline for natural gas service from Shelby, Mont., to Great Falls, about 80 miles, to include compressor plans and other mechanical structures, to cost $1,750,000. The output will be used by the Great Falls Gas Co.

The Lehigh Briquetting Co., Lehigh, N. D., has awarded a general contract to the Arnold Construction Co., Guardian Life Building, St. Paul, Minn., for the initial units of its proposed fuel briquette manufacturing plant, with power house, machine shop and other mechanical structures. The contractor will take bids on subcontracts at once. The entire project will cost more than $600,000 with machinery. R. W. Richardson, Fourth and Roberts Streets, St. Paul, is consulting engineer. K. A. Loven is company engineer at Lehigh.

The Illinois Power & Light Co., 231 South La Salle Street, Chicago, operating at Bloomington, Danville, Decatur, Ill., and vicinity, has arranged for a bond issue of $5,000,000, a portion of the fund to be used for expansion and improvements.

Milwaukee

MILWAUKEE, Oct. 31.

BUSINESS in machine tools during October has hardly equalled earlier expectations and prospects for November are considered only fair. The absence of general buying by the automotive industry is being felt more and more, and while inquiry from this source is moderately active, orders are developing slowly. There is a generally hesitant feeling in all groups of tool users with respect to the acquisition of new machinery beyond the most urgent replacements. The used tool situation is hardly favorable, but the accumulation of stocks is not heavy.

The Milwaukee Machine Products Co., Milwaukee, has been incorporated with an initial capital of $10,000 and is establishing a machine shop at 1671 Green Bay Avenue. The principals are Gottlieb Mueller, formerly connected with the Krahn Mfg. Co.; Fred Wandel and Raymond A. Hintz.

Contract has been awarded for an addition, 75 x 176 ft., to the plant of the Kearney & Trecker Corporation, Milwaukee, which will provide increased floor space of 13,400 sq. ft. The company has been operating at practically full capacity for more than a year and with a small night force for several months.

The American Electric Motors, Inc., Cedarburg, Wis., the newly acquired subsidiary of the Splitdorf-Bethlehem Electric Co. Newark, N. J., has let contract to Vollmar & Liesenberg, local, for a one-story factory addition 60 x 80 ft., to be completed about Nov. 20. Walter Rautenstrauch is president and general manager.

The Eau Claire Milk Producers Association, Eau Claire, Wis., has abandoned its plan of erecting a new factory, warehouse and cold storage building, having acquired a four-story structure, 100 x 102 ft., which will be remodeled and equipped at a cost of $200,000 or more. The project is in charge of the Douthitt Engineering Co., 100 West Monroe Street, Chicago.

The Moloch Foundry & Machine Co., Kaukauna, Wis., manufacturer of automatic stokers, power hammers, etc., which is completing a new foundry costing $75,000 as a fire replacement, will also erect a new pattern storage building, 30 x 80 ft., of steel construction.

The Board of Education, Sheboygan Falls, Wis., has commissioned Oppenhamer & Obel, architects, Wausau and Green Bay, Wis., to design a new high school, with manual training departments, and alterations in the present two buildings, with a new steam heating plant. The cost is estimated at $250,000. Bids will be taken immediately after Jan. 1. E. G. Wipperman is superintendent of schools.

The village of Osseo, Wis., expects to ask bids shortly for the construction and equipment of a new waterworks and sewage system costing $100,000, with deep wells and complete pumping plant and distributing system, designed by Druar & Milinowski, consulting engineers, 500 Globe Building, St. Paul, Minn. J. W. Smith is village clerk.

Van Ryn & DeGelleke, architects, 114 Wisconsin Avenue, Milwaukee, have plans for a three-story brick and concrete manufacturing building, 120 x 270 ft., and a garage and warehouse, to be erected on Green Bay Avenue. The name of the owner and the character of the plant are being withheld for the present.

The Layton Park Motor Co., 1320 Forest Home Avenue, Milwaukee, is about to award contracts for the construction of a one-story service and repair shop addition, 69 x 130 ft. Davis & Tuckwell, 377 National Avenue, local, are architects and engineers.

A $100,000 plant will be erected by the South Side Wet Wash Laundry, Inc., at 566-582 Muskego Avenue, Milwaukee, according to plans by A. H. Kiennapel, architects, 445 Milwaukee Street, local. It will be 120 x 217 ft., two stories, and require complete new equipment. F. W. Luetzow, 641 Fifteenth Avenue, is president.

The Milwaukee File & Rasp Co., Milwaukee, capital stock $5,000, has been incorporated by S. K. Larrabee, K. M. Palmer and A. Vander Heyden to establish a plant for the manufacture of tools. Definite plans have not been given out.

Cincinnati

CINCINNATI, Oct. 31.

MACHINE tool bookings in October showed a gain of approximately 25 per cent over September, much of the increase being accounted for by orders from the automotive industry. Despite the improvement, however, business is far below the level maintained during the fall of 1926. Local builders are of the opinion that there will be a decline in buying the remainder of the year and that a return to a more favorable status cannot be expected until the spring of 1928. One of the main factors confirming this opinion is the absence of inquiries from automobile manufacturers. Outstanding quotations on tools from the general industrial field, on the other hand, are large. Several companies report that these total from $75,000 to $100,000, but prospective buyers are holding up action until industrial conditions justify expenditures for new equipment. Meanwhile, most machine tool builders are operating their shops on a curtailed production basis.

The Norfolk & Western Railroad is taking bids until Nov. 3 on 104 machines covering its 1927 tool budget, while the Missouri-Kansas-Texas is said to have issued a list. The United States Navy is inquiring for 11 engine lathes for delivery to Mare Island, Cal. The United States Shipping Board has postponed action for 60 days on seven lathes for San Pedro, Cal. The Chesapeake & Ohio Railroad has bought a small engine lathe for installation at its Ashland, Ky., shops.

Norfolk & Western Tool List

One semi-automatic bolt threader to thread ⅜ in. to ¾ in. in diameter and 1¼ in. to 5½ in. long.
One single-head bolt threader to thread up to 1½ in. with complete set of R. H. dies.
Two 8-in. x 8-ft. cylinder boring bars.
One 3-in. spindle horizontal boring mill.
Two 42-in. vertical boring mills, two heads on rail and one side head.
One 36-in. vertical boring mill, two heads on rail and one side head.
One 84-in. vertical boring mill, two heads on rail and one side head.
Four 36-in. crank planers.
One precision centering machine for pieces up to 16-in. long.
Two 48-in. plain radial drills with tapping attachments.
Two 16-in. single-spindle sensitive drills.
Two 36-in. vertical drills with tapping attachments.
One 36-in. forging machine.
Six 12-in. x 2½-in. double floor grinders.
Five 18-in. x 3-in. double floor grinders.
Two 20-in. x 3½-in. double floor grinders.
One 18-in. x 3-in. swing grinder.
One 14-in. x 72-in. cylindrical grinder with gap on headstock to take 14-in. x 28-in.
One 10-in. x 42-in. cylindrical grinder.
One automatic internal bushing grinder.
One swing grinder, wheels 16-in. x 2½-in.
One 24-in. Ingersoll cutter grinder.
One Hanson-Whitney tap grinder.
One Sellers drill thinning machine.
One Heald packing ring grinder.
One Model D single stroke surface grinder (O. S. Walker Co.).
One Landis die chaser grinder.
One 1000-lb. Nazel air hammer.
Four Blacker B type power hammers.
One double-head car axle lathe.
One No. 25 Oliver pattern makers' lathe.
One No. 21 Oliver pattern makers' lathe.
One 42-in. vertical turret lathe with 6-in. bar for valve bushings.
Two 18-in. x 6-ft. engine lathes with taper attachments.
Three 20-in. x 6-ft. heavy-duty engine lathes with taper attachments and power cross feeds. Quote one lathe with 10-ft. centers.
One 22-in. x 6-ft. heavy-duty engine lathe with gap; swing in gap 30-in.; taper attachment.
One 24-in. x 6-ft. heavy-duty engine lathe with taper attachment.
One 42-in. x 9-ft. heavy-duty engine lathe with taper attachment.
One No. 4 milling machine with fixtures for rod brasses.
One 36 x 36-in. x 16-ft. planer-type milling machine, with three heads and with cutters and fixtures for driving box work.
One oil-grooving machine for bushings up to 4 in. in diameter and 6 in. long.
Three pipe threading machines—capacity ¼-in. up to 2½-in.
One Model DG Micro rod grinder.
One double-end punch and shearing machine to punch 1½-in. hole in 1⅛-in. steel and to shear 1¼-in. x 8-in. steel, 25-in. throat.
Five 50-ton power forcing presses for locomotive rod and driving box brasses.
One universal pattern worker.
One Simpson intensive sand mixer No. 2.
One No. 36 Oliver 14-in. swing cut-off saw.
One Ajax hot saw and burring machine.
One 36-in. shaper.
One rapid production marking machine.
One forge blower 5-in. outlet a. c., either 1 or 3 phase 110 or 220-volt.
One No. 7-9 Singer sewing machine, complete with motor and table.
One No. 42-5 Singer sewing machine, complete with motor and table.
One Dewalt wood worker.
Two 2-ton electric hoists, 20-ft. lift, single speed, pendant cord control with plain trolleys.
Four 1-ton electric hoists, 8-ft. lift, single speed, pendant cord control, with plain trolleys.

All machines are to be motor-driven, all motors to operate on 3-phase, 60-cycle, 220-volt, alternating current.

In addition to motor-driven tools, the list includes the following:

Two cylinder or dome facing machines, to face cylinders 26 in. to 40 in. in diameter.
One cylinder or dome facing machine, to face cylinders up to 26 in. in diameter.
One Micro air pump grinder.
One No. 3 22-in. x 8-in. x 12-ft. abrasive surface grinder, with exhaust attachment, magnetic chuck and demagnetizer.
One pneumatic jarring machine, table 24-in. x 30-in.
One No. 2A Warner & Swasey turret lathe with bar equipment.
One No. 2A Warner & Swasey turret lathe with chucking equipment.
One No. 3A Warner & Swasey turret lathe with chucking equipment.
One 36-in. pneumatic valve seat planing machine.
One No. 2 hand-operated Dries & Krump cornice brake.
One ⅜-in. to ½-in. hand-operated punch and shear.
One pneumatic gap riveter, 1-in. hot rivets, 36-in. throat.

The Athens Stove Works, Inc., Athens, Tenn., has arranged for an increase in capital from $100,000 to $150,000, a portion of the fund to be used for general expansion.

The Certified Lubricants Co., Cincinnati, has acquired property, 32 x 125 ft., at 1819-21 Central Avenue, and will erect a new five-story storage and distributing plant, to cost more than $85,000 with equipment.

J. Preston Bradshaw, St. Louis, architect, has plans under way for a new multi-story automobile service, repair and garage building at Louisville to cost upward of $200,000, for which bids will soon be asked on general contract.

The Gish Co., Inc., Central City, Ky., is planning the purchase of spring coil winding machines and is desirous of receiving prices and information.

The Air Corps, Material Division, Wright Field, Dayton, Ohio, is asking bids until Nov. 8 for 60 spur-geared drive chain hoists, circular 124; until Nov. 11 for a quantity of air combat equipment, circular 116; until Nov. 7 for aircraft utility parts for installing carbureters on inverted Liberty engines, circular 120.

E. W. Cooper, 510 Deaderick Street, Nashville, Tenn., engineer, has inquiries out for a large size revolving screen, trunnion drive; two belt conveyors, 24 in. or wider; a belt and bucket elevator, large size, and a gyratory crusher, No. 9 or No. 10.

The Board of Education, 216 East Ninth Street, Cincinnati, is said to be planning the installation of manual training equipment in the proposed new Walnut Hills High School to cost about $1,000,000. Garber & Woodward, 4 West Forty-seventh Street, are architects.

The Kentucky Electric Development Co., Louisville, is arranging for an increase in capital from $200,000 to $300,000, a portion of the fund to be used for general expansion. Plans are under way for new transmission lines.

Indiana

INDIANAPOLIS, Oct. 31.

CONTRACT has been let by M. B. Skinner & Co., 558-62 West Washington Street, Chicago, manufacturers of cutters and other equipment, to the H. G. Christman Co., South Bend, Ind., for a new one-story and basement plant, 150 x 150 ft., at South Bend, to cost close to $100,000 including equipment.

The Char Products Co., St. Clair Avenue and the Belt Line Railroad, Indianapolis, manufacturer of case hardening materials, etc., is said to be planning to rebuild the portion of its plant destroyed by fire Oct. 23, with loss estimated at $25,000 including equipment.

The Board of Education, Lafayette, Ind., is considering the installation of manual training equipment in a proposed two-story addition to the Jefferson High School to cost $325,000. Walter Scholer, Painters' & Decorators' Building, is architect. R. W. Noland, Lafayette Life Building, is mechanical engineer.

Bishop, Knowlton & Carson, 312 North Meridian Street, Indianapolis, architects, have plans for a three-story and basement automobile service, repair and garage building, 100 x 165 ft., to cost about $100,000 with equipment.

The Elliott Bending Machine Co., Columbus, Ind., recently organized, will operate a local plant for the manufacture of a special wood-bending machine and parts. The equipment is used without steam, the wood being bent by gas or electrically heated rollers, which operate on a continuous metal band.

The Empire Box Co., 518 West Monroe Street, Chicago, manufacturer of paper and cardboard boxes, cartons, etc., has asked bids on general contract for a new one-story plant at South Bend, Ind., to cost upward of $80,000 with machinery. W. Ellwood, Christman Building, South Bend, is architect.

The Board of School Commissioners, Old Library Building, Indianapolis, will install manual training equipment in two additions to be erected at the Arsenal Technical High School to be each three stories, 60 x 100 ft., to cost $250,000. Vonnegut, Bohn & Mueller, Indiana Trust Building, are architects; Snider & Rotz, Merchants' Bank Building, are mechanical engineers. Bids have been asked on a general contract until Nov. 11.

The Board of Water Commissioners, City Hall, Evansville, Ind., is considering the erection of a two-story municipal automobile service, repair and garage building, 80 x 200 ft., with portion reserved for storage and distributing service. It is reported to cost more than $65,000 including equipment.

The National Bridge & Supply Co., Terre Haute, Ind., has been organized to manufacture road machinery, steel bridges, culverts and kindred products. Manufacturing is now being carried on under contract, but later the company expects to do its own manufacturing, particularly of corrugated steel culverts. A branch office will be maintained at Indianapolis.

The Atwood Mfg. Equipment Co., Kokomo, Ind., has been incorporated to manufacture insert point lathe and grinder centers, stud setters, power screw drivers and other equipment. It has purchased the plant of the Worth Wire Co. at Kokomo and machinery is being installed. The company will be in the market for additional equipment and materials in three or four months.

St. Louis

ST. LOUIS, Oct. 31.

THE Missouri Pacific Railroad Co., Railway Exchange Building, St. Louis, has acquired a tract of more than 20 acres at Nettleton, Mo., and is reported planning new car and locomotive repair shops on a portion of the site. E. A. Hadley is chief engineer.

The Crane Co., 836 South Michigan Boulevard, Chicago, is completing plans for a new one and two-story and basement factory branch and distributing plant, 150 x 150 ft., at Wichita, Kan., to cost approximately $100,000 with equipment. Schmidt, Boucher & Overend, Fourth National Bank Building, Wichita, are architects.

The Common Council, Mangum, Okla., is considering the installation of pumping machinery and auxiliary equipment in connection with extensions and improvements in the municipal waterworks to cost $75,000.

The Southwestern Bell Telephone Co., Hollenberg Building, Little Rock, Ark., and St. Louis, has plans for a one-story automobile service, repair and garage building, 50 x 125 ft., for company trucks and cars, to cost in excess of $75,000 with equipment.

The American Natural Gas Corporation, Tulsa, Okla., is disposing of a bond issue of $10,000,000, a portion of the fund to be used for extensions and improvements, including pipe line construction, compressor stations, etc.

The Herman Body Co., 4420 Clayton Avenue, St. Louis, manufacturer of automobile bodies, is said to have authorized plans for rebuilding the portion of its plant recently destroyed by tornado, with loss reported upward of $25,000 including equipment.

The Tulsa Motor Ramp Co., Tulsa, Okla., has filed plans for a six-story service, repair and garage building, 100 x 140 ft., to cost more than $150,000 with equipment. N. B. Fleming, Bliss Building, is architect.

The Builders' Steel Co., Kansas City, Mo., recently formed with a capital of $50,000, will occupy a plant at Twelfth and Kenwood Streets, North Kansas City, for steel fabricating and other iron and steel working. An option has been taken on adjoining site for a future expansion. K. W. Schmidt and B. C. Zwart head the company.

The Central Power Co., Grand Island, Neb., has approved plans for an addition to its local steam-operated electric generating plant, to cost about $25,000 with equipment. Arthur D. Baker, 217 North Pine Street, is architect.

Major Albert Bond Lambert, St. Louis, operating the Lambert-St. Louis flying field, has plans for enlarging the property. An additional tract of about 200 acres has been secured and new buildings will be erected for hangar, machine repair shops and other mechanical service. The entire project is expected to cost more than $500,000. Plans will be submitted at an early date to the city Airport Plan and Scope Committee for ratification.

The Arkansas Cold Storage Co., Little Rock, Ark., has plans under way for a three-story addition to its cold storage and refrigerating plant, to cost more than $85,000 with equipment.

Morris & Co., Inc., Kansas City, Kan., meat packer, is said to be planning to rebuild the portion of its glue manufacturing works recently destroyed by fire, with loss reported in excess of $250,000 including equipment.

Gulf States

BIRMINGHAM, Oct. 31.

THE Board of Education, Birmingham, is considering the installation of manual training equipment in a proposed new high school on the South Side, estimated to cost $1,000,000. Plans will be drawn by Warren, Knight & Davis, Empire Building, architects. Dr. C. B. Glenn is superintendent.

Atlee B. and Robert M. Ayres, Bedell Building, San Antonio, Tex., architects, have filed plans for a four-story automobile service, repair and garage building, to cost about $130,000 with equipment.

The Houston Lighting & Power Co., Houston, Tex., is considering enlargements in its steam-operated electric power plant at Deepwater, Tex., to cost upward of $2,000,000 with proposed transmission line.

Hudson & Mims, Monroeville, Ala., have authorized plans for a new ice-manufacturing and cold storage plant at Pensacola, Fla., where site was recently acquired. It will have an initial output of about 20 tons per day and is reported to cost approximately $80,000. The structure will provide for increase in the cold storage division.

J. W. Summitt, commissioner of public works, Palmetto, Fla., will receive bids until Nov. 22 for equipment for the municipal electric lighting station, including one Diesel oil engine generating unit, 125-hp. capacity, including generator, exciter, oil pumps, fuel tanks and kindred equipment; also electric generator for a 50-hp. vertical Diesel engine, now installed at the plant, with switchboard and accessories.

Mack & Collins, Ouachita National Bank Building, Monroe, La., are at the head of a project to construct and operate a pipe line from the Monroe gas fields to Mobile, Ala., about 278 miles, to cost more than $10,000,000 with equipment.

The Alabama Power Co., Birmingham, is considering the early construction of a new steam-operated electric gener-

ating plant in the Warrior coal field section, Walker County, Ala., with initial capacity of 50,000 kw. and ultimate output of about four times that amount. The station will cost more than $1,000,000 with transmission system. The company is completing plans for a consolidation with the Gulf Electric Co. and the Houston Power Co., to include the construction of transmission lines for interchange in service between the three interests.

The Board of Trustees, University of Texas, Austin, has approved plans for the immediate erection of a one-story engineering laboratory, 100 x 142 ft., to cost about $80,000 with equipment. The Herbert M. Greene Co., Construction Industries Building, Dallas, Tex., is architect.

The Inge Auto Parts Co., Inc., 1952 North Street, Baton Rouge, La., recently organized, has acquired the local works and business of the Auto Parts Co., and will continue operations for the production of automobile parts and equipment, including repair work. It is planned to install a recharging machine, rectifier and other equipment.

J. L. Schroeder, 6900 Washington Street, Houston, Tex., is considering the early rebuilding of the portion of his airplane works, including parts and repair departments, recently destroyed by fire, with loss close to $20,000 with equipment.

The Acme Wire & Iron Works, Inc., 1601 North Laredo Street, San Antonio, Tex., has awarded a general contract to B. A. Wagner, 330 Eads Avenue, for a one-story addition, 60 x 93 ft. Adams & Adams, Builders' Exchange Building, are architects.

The Mississippi Cottonseed Products Co., care of George W. Covington, Hazlehurst, Miss., president, recently organized under Delaware laws, will take over and operate a group of 13 cottonseed oil mills in different parts of the State. The company has arranged for a bond issue of $1,250,000, a portion of the fund to provide for the consolidation and for extensions and improvements. J. H. Turbeville, Jackson, Miss., is secretary and treasurer.

The San Antonio Public Service Co., San Antonio, Tex., is completing plans for a new power house to provide for an increase of about 40,000-hp. capacity. The project will cover an addition to the present steam-operated electric generating plant of the Comal Power Co., an affiliated organization, at New Braunfels, Tex., or an entirely new station on the Guadalupe River at McQueen, near Seguin, Tex., soon to be determined. Extensions will be made in transmission lines. The entire expansion is estimated to cost more than $1,000,000.

The American Mfg. Co., Hodge Station, Fort Worth, Tex., manufacturer of oil well equipment and supplies, contemplates the early erection of a new one-story plant to cost $45,000 with equipment.

The Houma-Terrebonne Lumber Co., Inc., Houma, La., is considering the installation of additional machinery at its mill, including equipment for box manufacture and band mills.

Pacific Coast

SAN FRANCISCO, Oct. 26.

THE Sacramento Pulp & Paper Co., Sacramento, Cal., temporary office at 404 Bryte Building, recently formed with a capital of $1,000,000, has plans under way for the erection of a new pulp and paper mill near the city, to operate under a special process, using grape vine cuttings as raw material. The initial mill is reported to cost upward of $400,000. Work is scheduled to begin in November. The new company is headed by H. D. Wagnon, R. M. Conley and J. Garnett Smith.

H. A. Meisel, 504 South Spring Street, Los Angeles, has awarded a general contract to the Industrial Building Co., Pacific National Bank Building, for a new one-story woodworking plant, 60 x 85 ft.

The Modesto Irrigation District, Modesto, Cal., is arranging an appropriation of $22,600 for the purchase of drainage pumps in the 1927-28 budget. W. H. Holmes is engineer.

The Crane Co., San Francisco, with headquarters at 836 South Michigan Boulevard, Chicago, has awarded a general contract to James C. Ray, Monadnock Building, for a one-story addition to its factory branch and distributing plant at Second and Brannan Streets, to cost about $45,000. It will be used for extension in the pipe division.

The Nevada-California Electric Corporation, Denver, Colo., operating in the eastern section of California and southwestern portion of Nevada, with group of eleven hydroelectric generating plants, transmission lines, etc., is disposing of a bond issue of $2,750,000, a portion of the proceeds to be used for expansion and betterments.

The Union Oil Co., Mills Building, San Francisco, has plans for a one-story machine shop and automobile service and garage building at Emeryville, Cal., to cost about $35,000. The engineering department of the company is in charge.

The American Manganese Products Co., Redwood City, Cal., is reported contemplating the replacement of its plant, occupied under lease, recently destroyed by fire, with loss reported at close to $50,000 including machinery.

The Shell Pipe Line Corporation, operated by the Shell Union Oil Corporation, 200 Bush Street, San Francisco, is disposing of a bond issue of $30,000,000, a portion of the proceeds to be used for the acquisition of properties in the Middle Western district, and for the construction of a number of additions in present pipe line system. J. C. van Eck is president of the parent company and chairman of the board of the Shell Pipe Line Corporation.

The Feather River Pine Mills, Inc., Oroville, Cal., has authorized the rebuilding of the portion of its plant recently destroyed by fire with loss estimated in excess of $1,000,000 including machinery.

The City Council, Nogales, Ariz., plans the installation of pumping machinery and other power equipment in connection with proposed extensions and improvements in the municipal waterworks, to cost about $50,000. A bond issue is being arranged. The Weiland Engineering Co., Pueblo, Colo., is consulting engineer.

The Eureka-Nevada Railway Co., Palisade, Nev., will soon begin the construction of a new engine house with repair facilities, to replace a portion of its shops recently destroyed by fire. A. B. Shobar is superintendent of construction.

The Union Rock Co., Los Angeles, operating a group of eleven rock-crushing plants and other properties, has arranged for a bond issue of $2,500,000, a portion of the fund to be used for expansion.

Plans are being prepared by the Racor Pacific Frog & Switch Co. for an additional 10,000 sq. ft. of floor space to its new plant at Slauson Avenue and Downey Road, Los Angeles, to cost, with machinery, about $50,000. The Racor company is one of eight branches of the Ramapo Ajax Corporation, Hilburn, N. Y.

The Price-Pfister Brass Mfg. Co., 2922 Humboldt Street, Los Angeles, will shortly start the erection of a one-story machine shop, to cost approximately $21,000 including equipment.

Canada

TORONTO, Oct. 31.

DEMAND for machine tools in this market continues, and indications are that it will last well into the coming year. Some builders and dealers report that so far this year business shows an increase of about 25 per cent over that of 1926. While the General Motors Corporation, Oshawa, Ont., and the Ford Motor Co. of Canada, Ford, Ont., have been responsible for a large part of the improvement in machine tool sales in this territory, it is understood that there are still some good sized lists to be placed by these companies, and that the Willys-Overland, Ltd., Toronto, is also preparing to enter the market for equipment for its proposed addition on Weston Road.

The General Steel Products, Ltd., 605 King Street East, Toronto, has started work on an addition which, when completed will house considerable additional machinery and tools.

The Goodyear Tire & Rubber Co. of Canada, has started construction on an extension to its plant at New Toronto, which when completed will give an additional 50,000 ft. of floor space to the present premises. The building will be four-stories, 100 x 120 ft.

The Montreal Island & Power Co., 83 Craig Street West, Montreal, has had plans prepared by the Power Corporation of Canada, Ltd., engineer, 20 St. Nicholas Street, for the construction of a power plant at Visitation Island, River des Prairies, Back River, to cost approximately $10,000,000. Tenders will be called by engineers this winter, and construction work will start in 1928.

M. Leduc, Donnacona, Que., has the contract for the erection of a one-story paper plant, 100 x 150 ft. of reinforced concrete construction and to cost $150,000. for Ruberoid, Ltd., Portneuf, Que.

The J. Ford Co. Portneuf Station, Que., manufacturer of roofing felt etc., has let the contract to Gauthier & Julien, for the erection of a plant to cost $100,000. The building will be three-stories, 200 x 300 ft., of concrete construction. Materials and equipment will be purchased by the contractors.

G. W. Reed & Co., 37 St. Antoine Street, Montreal, manufacturer of fire-proof windows and doors, metal stampings, etc. have let contract to the Church Ross Co., 698 St.

Catharine Street, for the erection of a one and one-half story factory, 76 x 146 ft., to cost $35,000.

The Mount Royal Color & Varnish Co., 195 Dorchester Street East, Montreal, has let general contract to J. T. Levasseur, 5414 Eleventh Avenue, Rosemount, Que. for the erection of a factory to cost $25,000. It will be two stories, 58 x 196 ft. of reinforced concrete construction.

The Lysaught Dominion Sheet Metal Corporation, 1322 Burlington Street East, Hamilton, Ont., has let the general contract to W. H. Cooper, Ltd., 6 Hughson Street North for the erection of a one-story addition, 75 x 175 ft., to cost $50,000.

The Brown Corporation, 71 St. Pierre Street, Quebec, Que., is contemplating erecting a pulp mill, electric transmission line and wharf at Riviere Madeleine, Que., construction to start next sun.mer.

The Werlich Mfg. Co., Bishop Street, Preston, Ont., has purchased a site adjoining its present plant and proposes to start work soon on the erection of an addition. John Werlich is manager of the company.

William Kennedy & Sons Ltd., Owen Sound, Ont., has completed arrangements with the Falk Corporation, Milwaukee for the manufacture and sale in Canada of Falk continuous tooth herringbone gears, herringbone speed reducers and flexible couplings.

Foreign

A COMPANY at Naples, Italy, is planning the construction of a new plant for the manufacture of tin cans and metal containers within the free zone of the port, where site has been secured. It is purposed to use American machinery and a representative of the company will come to the United States soon to purchase necessary equipment. Information at the office of the Bureau of Foreign and Domestic Commerce, Washington, reference Italy No. 258121; also, at the American Consulate, Naples, William W. Schott, consul.

The Department of Public Works, Supplies and Tenders Board, Wellington, New Zealand, is asking bids until Jan. 17 for air brake switches with operating gear, two sets earthen switches, one set of choke coils, one steel structure complete with strain and post insulators, one 2250-kva. main panel switchboard, iron clad with instruments complete, transformers, metering equipment and other apparatus; until Jan. 24 for other electrical equipment, including one 1500-kva. main panel iron clad switchboard, with instruments complete; one service transformer panel, iron clad with switch fuse and 15-kva. transformer, and for one meter panel with kva. and kwh. metering equipment complete.

The Bureau of Yards and Docks, Navy Department, Washington, is asking bids until Nov. 23 for one steam plant for the Pearl Harbor naval base, Hawaiian Islands, specification 5481; also for a refrigerating plant for the same location, specification 5482.

The Five-Lille Steel Mills, Lille, France, manufacturer of locomotives, sugar machinery and other heavy equipment, is reported to be planning the installation of improved machinery of American design for increase in capacity and efficiency. Louis Borde, a director of the company, has recently arrived in the United States for a tour of inspection of similar plants.

The Compania Aeronautica Espanola, Madrid, Spain, has concluded negotiations for the purchase of a tract totaling 31,800 sq. meters (about 340,300 sq. ft.) as a site for a new plant for the manufacture of airplanes and hydroplanes. The American Consulate, Madrid, Charles A. Livengood, commercial attaché, has information regarding the project.

The Anshan Iron Works, Manchuria, a subsidiary of the South Manchurian Railroad Co., Mukden, is planning for the construction of new blast furnaces to increase its present capacity from 200,000 to 500,000 tons of pig iron per annum. J. Yamamoto is president of the parent company. Information at the office of the American Consulate, Tokyo, Japan, J. H. Ehlers, assistant commercial attaché.

Dodge Brothers, Inc., Detroit, in the quarter ended Sept. 30, reports net income of $3,986,153 equivalent to 48c. a share on common stock. In the previous quarter the company earned $4,939,074, and in the first nine months of the year, $11,690,331.

The E. R. Caldwell & Son Brass Co., Inc., 610 West Fayette Street, Syracuse, N. Y., filed a petition in voluntary bankruptcy on Oct. 21. Harold S. Coyne is receiver with power to continue the business and enter into contracts for the purchase of new material. An injunction was issued against several firms who have filed suits during the past few weeks against the Caldwell company, restraining them from any action. The petition in bankruptcy was favored by the stockholders at a recent meeting.

NEW TRADE PUBLICATIONS

Telescopic Hoists.—Gillis & Geoghegan, Inc., 537 West Broadway, New York. Catalog, illustrating pictorially and by mechanical drawings the company's hand power and electric telescopic hoists. Special sections are devoted to their watertight sidewalk doors with automatic opening, closing-locking device and safety spring guard gates.

Car Retarders.—Webster Mfg. Co., 1856 North Kostner Avenue, Chicago. Leaflet, briefly describing the company's standard and heavy duty car retarders. The device requires no overhead structure and is designed for one-man operation.

Pumps.—Deming Co., Salem, Ohio. Parts List 2754, supplementing the company's general catalog 27, designed for the convenience of dealers and jobbers in purchasing castings by symbol number.

Towers and Tanks.—W. E. Caldwell Co., Inc., Louisville, Ky. Annual catalog, containing full list of steel and wood tanks, towers, equipment and accessories manufactured by the company.

Induction Motors.—Reliance Electric & Engineering Co., Ivanhoe Road, Cleveland. Bulletin 101, devoted to the type AA induction motor for two- and three-phase alternating current circuits. The booklet is adequately illustrated and provides full construction and operation details, as well as complete specifications and tables of ratings.

Alligator Shears.—Canton Foundry & Machine Co., Canton, Ohio. Booklet containing full description of the company's all-steel double-geared alligator shears. The shears are made in high and low knife types and specifications and illustrations of the various models are included.

Woodworking Machines.—Defiance Machine Works, Defiance, Ohio. Catalog, 20 pages, describes and illustrates a line of wood shaping machinery. There are 45 machines listed, most of which are designed for various shaping operations for use in the automotive and other industries. These machines are built with ball bearing spindles with motors mounted on the spindles and also with belt drive.

Sheffield Steels.—William Jessop & Sons, Inc., 91 John Street, New York. Lists of the various brands of crucible steels made by the mill in Sheffield, England, giving the various tools into which they can best be worked, and the proper forging temperatures and heat treating programs. Considerable elementary information on heat treating theory is also included.

Worm Gearing.—Foote Brothers Gear & Machine Co., 215 North Curtis Street, Chicago. Catalog 400 of 24 pages, giving the evolution of the worm gear, the influence brought to bear upon its design by the automotive industry and the uses and application of the IXL Modern-type worm gearing.

Concrete Inserts.—Midwest Steel & Supply Co., Bradford, Pa. Four-page folder showing use of inserts for various purposes in manufacturing and other buildings. The illustrations are both of the equipment in use and representative buildings so equipped.

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